



ARVIN-EDISON WATER STORAGE DISTRICT

**WATER MANAGEMENT PLAN
UPDATE**

PREPARED INDER THE 2005 STANDARD CRITERIA

FIRST DRAFT JANUARY 2008

TABLE OF CONTENTS

Arvin-Edison Water Storage District

Water Management Plan

Table of Contents

	<u>Page</u>
Section 1 – Description of District	
A. History	1-1
B. Location and Facilities	1-2
C. Topography and Soils	1-3
D. Climate	1-4
E. Natural and Cultural Resources	1-4
F. Operating Rules and Regulations	1-4
G. Water Measurement, Pricing and Billing	1-5
H. Water Shortage Allocation Policies	1-7
Section 2 – Inventory of Water Resources	
A. Surface Water Supply	2-1
B. Ground Water Supply	2-1
C. Other Water Supplies	2-1
D. Source Water Quality Monitoring Practices	2-1
E. Water Uses Within the District	2-2
F. Irrigation Drainage from the District	2-4
G. Water Accounting (Inventory)	2-5
1. Imported Surface Water by Source – AF	2-5a
2. Project Operations Summary	2-5b
3. 2005 Water Year Gross Spreading – AF	2-5c
Section 3 – Best Management Practices (BMPs) for Agricultural Contractors	
A. Critical (BMPs) for Agricultural Contractors	
1. Measure the Volume of Water	3-1
2. Designate a water conservation coordinator	3-1
3. Provide for the availability of water management services to water users	3-1
4. Pricing structure	3-2
5. Evaluate the need for changes in policies	3-2
6. Evaluate and improve efficiencies of Contractor's pumps	3-2
B. Exemptible (BMPs) for Agricultural Contractors	
1. Facilitate alternative land use	3-3
2. Facilitate the use of recycled urban wastewater	3-3
3. Facilitate the financing of capital improvements for in-farm irrigation systems	3-3
4. Incentive pricing	3-3
5. Line or pipe ditches and canals	3-3
6. Increase flexibility in water ordering by, and delivery to, water users	3-3
7. Construct and operate District spill and tailwater recovery systems	3-4
8. Optimize conjunctive use of surface and ground water	3-4

9. Automate canal structures	3-4
10. Facilitate or promote water customer pump testing and evaluation.	3-4
C. Provide a 3-Year Budget for Implementing BMPs	
1. Amount actually spent during current year	3-5
2. Projected Budget Summary for the next year	3-5
3. Projected budget summary for 3 rd year	3-5
D. Drainage Problem Area Programs	
1. District programs to improve drainage problem areas	3-7
E. District Quantifiable Objectives (QOs)	
1. District Participation in QOs	3-8

Section 4 – BMP's for Urban Contractors

A. Sections 1 to 5	4-1
B. Sections 6 to 13	4-2
C. Section 14	4-3
D. Attachment A – Drainage Problem Areas	4-5
E. Attachment B – Agricultural Exempt BMPs	4-6
F. Attachment C – Quantifiable Objectives	4-7
G. Attachment D – Crops List	4-8

District Water Inventory Tables

A. Ag Tables	
1. Table 1 Surface Water Supply	Tables -1
2. Table 2 Ground Water Supply	Tables -2
3. Table 3 Total Water Supply	Tables -3
4. Table 4 Distribution System	Tables -4
5. Table 5 Crop Water Needs	Tables -5
6. Table 6 District Water Budget	Tables -6
7. Table 7 Influence on Ground Water and Saline Sink	Tables -7
8. Table 8 Annual Water Quantities Delivered Under Each Right or Contract	Tables -8
B. Urban Tables	
1. Table 1 Urban Surface Water Supply	Tables -1

Attachments

Attachment A1 – Board Resolution Adopting the Plan	
1. Approving a Water Management Plan Update	
2. Certification	
Attachment A District Facilities Maps	
1. District Map	
2. Arvin Unit Map	
3. Caliente Unit Map	
4. Edison Unit Map	
5. Mettler Unit Map	
6. Tejon Unit Map	
7. White Wolf Unit Map	
Attachment B District Soils Maps	
1. Northeastern Kern General Soils Map	

2. Southeastern Kern General Soils Map
 3. Northwestern Kern General Soils Map
 4. Northwestern Kern Legend
- Attachment C District Rules and Regulations
1. Rules and Regulations for Distribution of Water
- Attachment D District Sample Bills
1. 2004 and 2005 Water Rates
 2. Sample Water Bill
 3. History of Water Costs and Assessments-Table
 4. History of Water Costs and Assessments-Graph
- Attachment E District Water Shortage Plan
1. Water Shortage (excerpted from Attachment C, p.16)
- Attachment F District Map of Groundwater Facilities
1. Balancing Reservoir
 2. North Canal Spreading Basin
 3. Sycamore Spreading Basin
 4. Tejon Spreading Basin
- Attachment G Groundwater Management Plan (excerpts)
1. Table of Contents from Groundwater Management Plan
 2. Spreading Works (see Attachment H-6)
 3. Well Fields (see Attachment H-6)
 4. Stabilization of Groundwater Levels (see Attachment H-6)
- Attachment H Groundwater Banking Plan
1. "Yellow Book"
 - a. Project Operations Summary
 - b. Accumulation of Underground Storage
 - c. Hydrograph of Water Level Fluctuations
 - d. Average Static Groundwater Depth
 - e. Hydrologic Inventory Chart
- Attachment I District Annual Water Quality Report
1. Canal Water Quality Summary – December to June
 2. Canal Water Quality Summary – June to December
 3. Summary Notes
 3. A-E Well Water Quality
- Attachment J Notices of District Education Programs and Services Available to Customers
1. North West Kern Resource Conservation District Plan 2005 Annual Report
- Attachment K District Water Order Form
1. Water Form
- Attachment L Climate Data
1. Monthly CIMIS Data
 2. Summary of December 2005 Climatological Observations
 3. Historical Climatological Data (2001-2005) – Graph
 4. Precipitation "Office"
 5. Precipitation "Sycamore"
 6. Precipitation "Tejon"
 7. Historical Precipitation by Year at District Office – Graph
- Attachment M Summary of Land Use
1. Spring 2005 Land Use Survey - Map

2. Spring 2005 Crop Summary - Table

3. Summary of Land Use (1968-2005)

Attachment N Water Requirements

1. Assessment of Reasonable Water Requirements by JMLord (55 pages)

SECTION 1

DESCRIPTION OF DISTRICT

Section 1: Description of the District

District Name: Arvin-Edison Water Storage District

Contact Name: Steve Lewis

Title: Staff Engineer

Telephone: (661) 854-5573

E-mail: slewis@aebsd.org

A. History

1. Date district formed: 1942 Date of first Reclamation contract: 1962
Original size (acres): 129,988 Current year (last complete calendar year): 2005

2. Current size, population, and irrigated acres

	Current Year
Size (acres)	131,660
Population se	26,000
Irrigated acres	111,602

3. Water supplies received in current year

Water Source	AF
Federal urban water	0
Federal Agricultural Water	200,114
State water	
Other Wholesaler (define)	
Local surface water	1,543
Upslope drain water	0
District ground water	174
Transferred water	23,105
Exchange water	24,754
Banking	3,929
Total	253,619

4. Annual entitlement under each right and/or contract

	AF	Source	Contract #	Contract Restrictions
USBR Urban AF/Y	0			
USBR Agriculture AF/Y	351,675	Friant CVP	14-06-200-229A-LTR1	None
Other AF/Y				
Other AF/Y				

5. Anticipated land-use changes: minor urbanization

6. Cropping patterns (Agric only): more permanent crops and more vegetables

List of current crops (crops with 5% or less of total acreage can be combined in the 'Other' category).

1986		1998		2005	
Crop Name	Acre	Crop Name	Acres	Crop Name	Acres
Grapes	24,483	Grapes	28,447	Grapes	29,566
Potatoes	15,278	Potatoes	19,807	Potatoes	16,150
Oranges	6,238	Oranges	12,007	Oranges/Tangerines	14,042
Cotton	12,881	Cotton	7,764	Wheat	6,773
				Carrots	5,469
Other (<5%)	44,739	Other (<5%)	45,969	Other (<5%)	39,620
Total	103,619	Total	113,99	Total	111,620

(See Appendix C for list of crop names)

7. Major irrigation methods (by acreage) (Agric only)

1986		1998		2005	
Irrigation Method	Acres	Irrigation Method	Acres	Irrigation Method	Acres
		Gravity	21,557	Gravity	17,035
		Sprinkler	49,502	Sprinkler	44,241
		Drip	23,645	Drip	24,674
		Micro-Drip	10,623	Micro-Drip	17,005
		Non-Irrigated	26,412	Non-Irrigated	28,705
Other		Other		Other	
Total		Total	105,327	Total	102,955

(See Appendix C for list of irrigation system types)

B. Location and Facilities

Attachment A shows points of delivery, turnouts (internal flow), and outflow (spill) points, measurement locations, conveyance system, storage facilities, operational loss recovery system, wells, and water quality monitoring locations

1. Incoming measurement methods and locations

Incoming Locations	Type of Measurement Device	Accuracy
Friant Kern Canal	Parshall Flume	2%
Cross Valley Canal and Wells	meters	2%
Kern River	rated gate	2%
Intertie Pipeline	meter	2%

2. Current year Agricultural Conveyance System

Miles Unlined - Canal	Miles Lined - Canal	Miles Piped	Miles - Other
0	45	170	0

3 Current year Urban Distribution System

Miles AC Pipe	Miles Steel Pipe	Miles Cast Iron Pipe	Miles - Other
0	0	0	0

4. *Storage facilities:* Balancing Reservoir 225 acre-feet, Spillway Reservoir 120 acre-feet, and Wasteway (emergency storage and recovery) 1,000 acre-feet

5. *Description of the agricultural spill recovery system:* Sumps and pumps at individual pumping plants. A 220 acre Wasteway basin and channel. The Spillway basin has a 40 cfs return capacity.

6. *Agricultural delivery system operation:* Water flows into the Arvin-Edison Canal and is pumped to pipelines which end in turnouts that connect to water users' irrigation systems. See Attachment H (p.5) for further discussion.

7. *Restrictions on water source(s)*

Source	Restriction	Cause of Restriction	Effect on Operations
See comment below			
Pressure pipelines	were designed in such a way as to require occasional proration of pumping during peak irrigation days but also to meet crop consumptive use requirements.		

8. *Proposed changes or additions to facilities and operations for the next 5 years:* expansion of the South Canal from the terminus to approximately 9 miles upstream to increase flow delivery. The District is also investigating additional reservoir storage to increase flexibility in water ordering and a check structure and pump back facility.

C. Topography and Soils

1. *Topography of the district and its impact on water operations and management:* Most of the district is gently sloping alluvial fans and flood plains with some areas of moderately sloping fans at the East and North ends of the District.

2. *District soil associations (Agric only)*

Soil Association	Estimated Acres	Effect on Water Operations and Management
Hesperia-Arvin-Whitewolf	55,000	frequent irrigations and flood control
Chanac-Pleito-Badlands	15,000	runoff from moderately steep slopes
Delano-Chanac	20,000	leaching fraction for slight salt accumulation
Panoche-Milham-Kimberlina	25,000	leaching fraction for slight salt accumulation
Calicreek-Whitewolf	5,000	frequent irrigations and flood control
Delano-Pleito-Hesperia	10,000	none
See Attachment B, District Soils Maps		

3. *Agricultural limitations resulting from soil problems (Agric only):* low water holding capacity, flooding, soil blowing, slight salt accumulation, moderately steep slopes

<i>Soil Problem</i>	<i>Estimated Acres</i>	<i>Effect on Water Operations and Management</i>
flooding and erosion	10,000	damage to farmland and equipment
slight salt accumulation	20,000	affects choice of crops and leaching fraction
moderately steep slope	2,000	requires slow application of water over time

D. Climate

1. General climate of the district service area

	<i>Jan</i>	<i>Feb</i>	<i>Mar</i>	<i>Apr</i>	<i>May</i>	<i>Jun</i>	<i>Jul</i>	<i>Aug</i>	<i>Sep</i>	<i>Oct</i>	<i>Nov</i>	<i>Dec</i>	<i>Annual</i>
Avg Precip.	1.54	1.58	1.77	0.89	0.29	0.10	0.01	0.08	0.23	0.50	0.88	1.00	8.89
Avg Temp.	50	53	58	64	70	77	82	82	76	66	54	48	65
Max. Temp.	80	79	92	98	104	112	110	111	106	101	87	78	78
Min. Temp.	28	32	36	35	42	51	56	58	58	39	29	22	52
ETo	1.22	2.20	3.66	5.67	7.44	8.15	8.67	7.81	5.67	4.03	2.13	1.22	57.87

Weather station ID CIMIS 125

Data period: Year 1974 to Year 2005

Average wind velocity 3.7 mph

Average annual frost-free days: 320

2. *Impact of microclimates on water management within the service area:* The District allows for the delivery of emergency water under special circumstances. Localized freezing temperatures can damage citrus - growers request additional water for frost protection and on windy days they request additional water to prevent crops from drying out and being sand blasted.

E. Natural and Cultural Resources

1. Natural resource areas within the service area

<i>Name</i>	<i>Estimated Acres</i>	<i>Description</i>
Sand Ridge Preserve	400	sand ridge with Bakersfield Cactus

2. *Description of district management of these resources in the past or present :* None

3. Recreational and/or cultural resources areas within the service area

<i>Name</i>	<i>Estimated Acres</i>	<i>Description</i>
Sycamore Canyon	200	golf course

F. Operating Rules and Regulations

Operating rules and regulations

See Attachment C, *District Rules and Regulations for the Distribution of Water.*

2. *Agricultural water allocation policy*

See Attachment C, Page 14 (Division IV: Ordering, Delivery, and Use of Water) 1. Annual Application(s) for Contract Water Service.

Summary - water allocated by contract via annual applications.

3. *Official and actual lead times necessary for water orders and shut-off (Agric only)*

See Attachment C, Page 15 (Division IV: Ordering, Delivery, and Use of Water) 4. Water Service Orders

Summary - Orders must be placed before 9 am the day before the change is requested.

4. *Policies regarding surface and subsurface drainage from farms (Agric only)*

See Attachment C, Page 16 (Division IV: Ordering, Delivery, and Use of Water) 11. Waste of Water

Summary - Water is to remain on farm - no surface drainage allowed. Subsurface drainage is not a big issue in Arvin-Edison because the soils are well drained.

5. *Policies on water transfers by the district and its customers*

Summary - Deliveries to growers are not based upon fixed contract quantities, and transfers between the District and customers do not occur.

Also, See (Division IV: Ordering, Delivery, and Use of Water) 9b. Water Shortage and 10. Use of Other Water Supplies.

G. Water Measurement, Pricing, and Billing

Agricultural Customers

1. Number of farms 156
2. Number of delivery points (turnouts and connections) 402
3. Number of delivery points serving more than one farm 45
4. Number of measured delivery points (meters and measurement devices) 2
5. Percentage of delivered water that was measured at a delivery point 100%

6. *Delivery point measurement device table (Agric only)*

Measurement Type	Number	Accuracy (+/- percentage)	Reading Frequency (Days)	Calibration Frequency (Months)	Maintenance Frequency (Months)
Orifices					
Propeller meter	402	2%	3	3	6
Weirs					
Flumes					
Venturi					
Metered gates					
Other (define)					
Total					

Urban Customers

1. Total number of connections 0
2. Total number of metered connections 0
3. Total number of connections not billed by quantity 0
4. Percentage of water that was measured at delivery point 0
5. Percentage of delivered water that was billed by quantity 0

6. Measurement device table

Meter Size and Type	Number	Accuracy (+/-percentage)	Reading Frequency (Days)	Calibration Frequency (Months)	Maintenance Frequency (Months)
5/8-3/4"					
1"					
1 1/2"					
2"					
3"					
4"					
"					
8"					
10"					
Compound					
Turbo					
Other (define)					
Total					

Agriculture and Urban Customers

1. Current year agriculture and /or urban water charges - including rate structures and billing frequency:
See Attachment D, for current year rate ordinance; also, see Table in Attachment D "History of Water Costs and Assessments"

2. Annual charges collected from customers (current year data)			
Charges (\$ unit)	Charge units (\$/af), (\$/ acre), (\$/hcf), (\$/customer) etc.	Units billed during year (af, acres, hcf, customer) etc.	\$ collected (\$ times units)
Fixed Charges			

Volumetric charges			
<i>Charges (\$ unit)</i>	<i>Charge units (\$/af), (\$/ acre), (\$/hcf), (\$/customer) etc.</i>	<i>Units billed during year (af, acres, hcf, customer) etc.</i>	<i>\$ collected (\$ times units)</i>

3. *Water-use data accounting procedures*

See Attachment D-2, District Sample Bills

Meters are read at the end of each month, verified by watermaster with respect to orders for accuracy and forwarded to accounts receivable.

H. Water Shortage Allocation Policies

1. *Current year water shortage policies or shortage response plan - specifying how reduced water supplies are allocated:* Allocation is by acres, water is prorated by acres irrigated
See Attachment E, District Water Shortage Plan

2. *Current year policies that address wasteful use of water and enforcement methods*
See Attachment C, Page 16 (Division IV: Ordering, Delivery, and Use of Water) 11. Waste of Water

SECTION 2

INVENTORY OF WATER RESOURCES

Section 2: Inventory of Water Resources

A. Surface Water Supply

1. *Acre-foot amounts of surface water delivered to the district by each of the district sources*
See Water Inventory Tables, Table 1. The District has only one contract for surface water - that is its CVP Friant Contract. All other imports are effected by exchange and limited ad hoc purchases.
2. *Amount of water delivered to the district by each of the district sources for the last 10 years*
See Tables in Section 2 "Imported Surface Water by Source," page 2-5a, and "Project Operations Summary," page 2-5b. Also, See Water Inventory Tables, Table 8. Please note District accounts for its supplies on a water year basis. Accordingly all responses are water year based unless otherwise noted.

B. Ground Water Supply

1. *Acre-foot amounts of ground water pumped and delivered by the district*
See Water Inventory Tables, Table 2

2. *Ground water basin(s) that underlies the service area*

Name	Size (Square Miles)	Usable Capacity (AF)	Safe Yield (AF/Y)
Tulare Lake Basin	205	>3 million AF	89,900

3. *Map of district-operated wells and managed ground water recharge areas*
See Attachment F, District Maps of Groundwater Facilities

Description of conjunctive use of surface and ground water The history of the District's conjunctive use program is summarized in a table 2-5b, see "Project Operations Summary" in Section 2 page 5b. Since its inception, the District has imported over 6.2 million AF of water, banked approximately 1.8 million and extracted just over 1.0 million AF.

5. *Ground Water Management Plan*
See Attachment G, Table of Contents from Groundwater Management Plan (complete plan copies available upon request).
6. *Ground Water Banking Plan*
See Attachment H, Water Resources Management Program ("Yellow Book")

C. Other Water Supplies

1. *"Other" water used as part of the water supply*
The District has no other water supply sources.

D. Source Water Quality Monitoring Practices

1. *Surface water and/or ground water quality problems, and how the quality problems limit the use of that source or affect customer use decisions:* Small groundwater area has high Boron, but no use problem due to blending. See Attachment I note.

2. *Potable Water Quality (Urban only)*

NA, No Urban Water

3. *Agricultural water quality concerns:* Yes _____ No X

4. *Description of the agricultural water quality testing program and the role of each participant, including the district, in the program:* Monthly testing of the entire canal system at a minimum of 3 locations, annual testing of a representative sample of District and grower wells.

5. *Current water quality monitoring programs for surface water by source (Agric only)*

<i>Analyses Performed</i>	<i>Frequency Range</i>	<i>Concentration Range</i>	<i>Average</i>
Irrigation, metals	Monthly	see tables in Attach. I	see tables in Attach. I
Irrigation, wet chem	Monthly	see tables in Attach. I	see tables in Attach. I

Current water quality monitoring programs for groundwater by source (Agric only)

<i>Analyses Performed</i>	<i>Frequency Range</i>	<i>Concentration Range</i>	<i>Average</i>
Irrigation, metals	yearly	see Attachment table I-4	see Attachment I-4
Irrigation, wet chem	yearly	see Attachment table I-4	see Attachment I-4
COC	every 3 years		

6. *Current year total dissolved solid range for surface water and ground water (Agric only)*
Surface water: 17 to 210 ppm *Ground water:* 33 to 1,600 ppm

E. Water Uses Within the District

1. *Agricultural*

See Water Inventory Tables, Table 5 - Crop Water Needs

2. *Types of irrigation systems used for each crop in year 2005*

<i>Crop name</i>	<i>Total Acres</i>	<i>Basin - acres</i>	<i>Furrow - acres</i>	<i>Sprinkler - acres</i>	<i>Low Volume - acres</i>	<i>Multiple methods -ac</i>
See Attachment	M					

3. Urban use by customer type in current year: NA

Customer Type	Number of Connections	(AF)
Single-family		
Multi-family		
Commercial		
Industrial		
Institutional		
Landscape irrigation		
Wholesale		
Recycled		
Other (specify)		
Other (specify)		
Other (specify)		
Unaccounted for		
Total	0	

4. Urban Wastewater Collection/Treatment Systems serving the service area – current year

Treatment Plant	Treatment Level (1, 2, 3)	AF	Disposal to / uses
	Total	0	
Total discharged to ocean and/ or saline sink		0	

5. Ground water recharge / management / banking in current year (Table 6)

Recharge Area	Method of Recharge	(AF)	Method of Retrieval
North Canal	infiltration	33,185	wells
Sycamore	infiltration	39,534	wells
Tejon	infiltration	33,004	wells
	Total	105,723	

6. Transfers and exchanges into or out of the service area in current year (Table 6)

From Whom	To Whom	(AF)	Use
Arvin-Edison WSD	Kern Tulare/Rag Gulch WD	22,059	Ag
Shafter Wasco ID	Arvin-Edison WSD	15,000	Ag
Kern Tulare/Rag Gulch WD	Arvin-Edison WSD	21,884	Ag
Other	Arvin-Edison WSD	12,018	Ag

7. *Trades, wheeling, wet/dry year exchanges or other transactions in current year (Table 6)*

<i>From Whom</i>	<i>To Whom</i>	<i>(AF)</i>	<i>Use</i>
Arvin-Edison WSD	Rosedale-Rio Bravo	51,676	Ag
Rosedale-Rio Bravo WSD	Arvin-Edison WSD	3,929	Ag

8. *Other uses of water in current year*

<i>Other Uses</i>	<i>AF</i>
None	

F. Irrigation Drainage from the Service area (Table 7) (Ag only)

Districts included in the drainage problem area, as identified in "A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley (September 1990)," should also complete Section 3 D.

1. *Surface and subsurface drain / return flows in current year: NA*

<i>Drain Location</i>	<i>(AF)</i>	<i>Types of Uses</i>
None		
Total	0	

2. *Description of the Drainage water quality testing program and the role of each participant in the program: NA*

3. *Drainage Water (surface and subsurface) Quality Testing Program*

<i>Analyses Performed</i>	<i>Concentration Range</i>	<i>Frequency Range</i>	<i>Average</i>
NA			

4. Usage limitation resulting from drainage water quality

Constituent	Usage Limitation
NA	

G. Water Accounting (Inventory)

1. Water Supplies Quantified

- a. Surface water supplies, imported and originating within the service area, by month (Table 1)
- b. Ground water extracted by the district, by month (Table 2)
- c. Effective precipitation by crop (Table 5)
- d. Estimated annual ground water extracted by non-district parties (Table 2)
- e. Recycled urban wastewater, by month (Table 3)
- f. Other supplies, by month (Table 1)

2. Water Used Quantified

- a. Agric. conveyance losses, including seepage, evaporation, and operational spills in canal systems (Agric. Table 4)
Urban leaks, breaks and flushing/fire uses in piped systems NA
- b. Consumptive use by riparian vegetation or environmental use (Table 6)
- c. Applied irrigation water - crop ET, water used for leaching / cultural practices (e.g., frost protection, soil reclamation, etc.) (Attachment N page 16)
- d. Urban water use NA
- e. Ground water recharge (Table 6)
- f. Water exchanges and transfers (Table 6)
- g. Estimated deep percolation within the service area (Agric. Table 6)
- h. Flows to perched water table or saline sink (Agric. Table 7)
- i. Irrigation spill or drain water leaving the District (Agric. Table 6)
- j. Other

3. Overall Water Inventory

- a. Table 6

**ARVIN-EDISON WATER STORAGE DISTRICT
IMPORTED SURFACE WATER BY SOURCE - AF**

WATER YEAR	FRIANT-KERN CANAL				KERN RIVER (4)	CALIF. AQUEDUCT	FARM WELLS (5)	TOTAL RECEIVED
	CLASS I (1)	CLASS II (2)	OTHER (3)	TOTAL				
1966	39,008	0	0	39,008	0	0	0	39,008
1967	26,884	56,967	0	83,851	0	0	0	83,851
1968	37,720	5,417	0	43,137	17,878	0	0	61,015
1969	17,884	181,055	0	198,939	1,057	0	0	199,996
1970	43,000	86,796	0	129,796	1,968	0	0	131,764
1971	43,933	102,820	0	146,753	0	0	0	146,753
1972	40,067	12,053	0	52,120	1,300	0	0	53,420
1973	46,996	130,609	0	177,605	3,985	0	0	181,590
1974	32,732	148,490	0	181,222	18,623	0	0	199,845
1975	35,666	146,076	0	181,742	17,325	3,597	0	202,664
1976	10,501	1,688	0	12,189	0	96,588	0	108,777
1977	2,351	0	0	2,351	400	28,812	0	31,563
1978	51,834	109,469	0	161,303	7,688	13,925	0	182,916
1979	19,268	82,701	0	101,969	0	123,973	0	225,942
1980	61,676	153,088	0	214,764	9,329	0	0	224,093
1981	21,607	8,246	0	29,853	696	141,590	0	172,139
1982	26,930	207,074	0	234,004	0	0	0	234,004
1983	45,818	120,398	0	166,216	16,109	0	0	182,325
1984	20,191	20,779	0	40,970	17,621	108,041	0	166,632
1985	22,449	0	0	22,449	5,645	130,117	0	158,211
1986	13,695	180,968	0	194,663	15,513	3,948	0	214,124
1987	11,742	0	0	11,742	0	114,222	0	125,964
1988	3,575	0	0	3,575	2,495	108,087	0	114,157
1989	920	81	0	1,001	0	118,679	0	119,680
1990	4,864	0	0	4,864	0	55,378	0	60,242
1991	17,510	0	0	17,510	0	19,285	0	36,795
1992	17,106	6,181	0	23,287	2,035	39,436	1,284	66,042
1993	40,000	150,734	0	190,734	8,821	61,292	0	260,847
1994	18,364	19,275	0	37,639	1,200	50,963	0	89,802
1995	1,213	215,171	32,685	249,069	9,802	23,696	0	282,567
1996	18,865	103,193	49,969	172,027	47,323	12,481	0	231,831
1997	33,265	117,410	25,990	176,665	68,772	12,795	0	258,232
1998	22,746	401	96,859	120,006	81,548	11,643	0	213,197
1999	9,960	37,473	22,078	69,511	37,588	144,243	0	251,342
2000	15,741	77,126	13,978	106,845	1,973	148,389	0	257,207
2001	24,028	6,038	2,720	32,786	662	13,602	156	47,206
2002	29,335	12,370	856	42,561	2,847	53,593	0	99,001
2003	33,743	57,788	270	91,801	0	79,414	0	171,215
2004	33,304	27,541	0	60,845	341	47,318	0	108,504
2005	46,673	122,927	52,989	222,589	10,148	20,708	0	253,445
TOTAL	1,043,164	2,708,403	298,394	4,049,961	410,692	1,785,815	1,440	6,247,908
AVG	26,079	67,710	7,460	101,249	10,267	57,607	36	169,159

9/3/2007

NOTES: THE WATER YEAR IS MARCH THROUGH FEBRUARY OF THE FOLLOWING YEAR

SUMMARIES\mpsource.xls

(1) DISTRICT'S FRIANT-KERN CLASS 1 SUPPLY PLUS CLASS 1 PURCHASES TAKEN IN-DISTRICT

(2) FRIANT-KERN CLASS 2 SUPPLY TAKEN IN-DISTRICT

(3) OTHER FRIANT-KERN SUPPLIES SUCH AS SECTION 215 AND FLOOD RELEASE PLUS PURCHASES AND EXCHANGES.

(4) CONSISTS PRIMARILY OF REREGULATED F-K SUPPLIES DELIVERED BY EXCHANGE PLUS
MINOR QUANTITIES OF PURCHASES OF KERN RIVER SUPPLY (<3,000 AF/YR AVERAGE)

(5) RESULT OF DISTRICT'S WELL WATER PURCHASE PROGRAM

ARVIN-EDISON WATER STORAGE DISTRICT
PROJECT OPERATIONS SUMMARY - 1966 TO 2005

(Values in acre-feet)

Water Year	Imported Water Supply	Deliveries to Water Users	Underground Storage						Banking Return	Losses and Metering Inaccuracy
			Gross Spreading	Evaporation	Net Percolation	Extractions	Change	Cumulative		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1966	39,008	0	42,137	735	41,402	0	41,402	41,402	0	-3,129
1967	83,851	17,867	64,903	1,239	63,664	0	63,664	105,066	0	1,081
1968	61,015	63,940	5,550	93	5,457	11,374	-5,917	99,149	0	2,899
1969	199,996	95,251	110,844	3,016	107,828	447	107,381	206,530	0	-5,652
1970	131,764	104,210	28,565	572	27,993	85	27,908	234,438	0	-926
1971	146,753	100,625	45,425	1,208	44,217	32	44,185	278,623	0	735
1972	53,420	104,626	309	3	306	52,659	-52,353	226,270	0	1,144
1973	181,590	119,128	65,824	2,018	63,806	769	63,037	289,307	0	-2,593
1974	199,845	133,996	66,121	1,885	64,236	1,725	62,511	351,818	0	1,453
1975	202,664	138,599	69,557	1,928	67,629	3,642	63,987	415,805	0	-1,850
1976	108,777	148,374	5,290	45	5,245	49,875	-44,630	371,175	0	4,988
1977	31,563	107,067	0	0	0	81,979	-81,979	289,196	0	6,475
1978	182,916	123,040	62,603	1,959	60,644	2,922	57,722	346,918	0	195
1979	225,942	148,438	74,613	1,815	72,798	308	72,490	419,408	0	3,199
1980	224,093	154,104	76,532	2,219	74,313	27	74,286	493,694	0	-6,516
1981	172,139	152,673	20,649	432	20,217	14,599	5,618	499,312	0	13,416
1982	234,004	137,517	90,150	2,794	87,356	12	87,344	586,656	0	6,349
1983	182,325	135,762	50,038	2,154	47,884	6,560	41,324	627,980	0	3,085
1984	166,632	148,175	16,428	347	16,081	9,321	6,760	634,740	0	11,350
1985	158,211	141,865	10,156	263	9,893	11,892	-1,999	632,741	0	18,082
1986	214,124	139,176	73,268	3,174	70,094	5,660	64,434	697,175	0	7,340
1987	125,964	140,339	2,156	149	2,007	24,332	-22,325	674,850	0	7,801
1988	114,157	139,541	2,907	152	2,755	33,742	-30,987	643,863	0	5,451
1989	119,680	148,095	6,066	159	5,907	36,278	-30,371	613,492	0	1,797
1990	60,242	149,969	2,403	62	2,341	99,152	-96,811	516,681	0	7,022
1991	36,795	113,312	173	3	170	80,544	-80,374	436,307	0	3,854
1992	66,042	132,682	9,469	216	9,253	84,483	-75,230	361,077	0	8,374
1993	260,847	130,681	122,917	2,516	120,401	6,595	113,806	474,883	0	13,844
1994	89,802	137,277	13,031	192	12,839	75,279	-62,440	412,443	0	14,773
1995	282,567	135,481	112,971	3,745	109,226	1,095	108,131	520,574	0	35,210
1996	231,831	147,303	57,539	3,433	54,106	0	54,106	574,680	0	26,989
1997	258,232	149,338	73,403	2,409	70,994	0	70,994	645,674	0	35,491
1998	213,197	114,123	82,360	4,904	77,456	681	76,775	722,449	0	17,395
1999	251,342	151,376	87,179	6,639	80,540	1,049	79,491	801,940	0	13,836
2000	257,207	143,549	101,950	4,552	97,398	5,427	91,971	893,911	0	17,135
2001	47,206	153,343	2,737	180	2,557	117,608	-115,051	778,860	0	8,734
2002	99,001	148,054	9,090	326	8,764	80,519	-71,755	707,105	11,483	10,893
2003	171,215	132,943	43,180	1,408	41,772	16,650	25,122	732,227	897	10,845
2004	108,504	143,662	31,669	265	31,404	100,125	-68,721	663,506	25,512	7,786
2005	253,445	139,033	105,723	3,917	101,806	174	101,632	765,138	0	8,863
	6,247,908	5,064,534	1,845,885	63,126	1,782,759	1,017,621	765,138		37,892	317,218

NOTES:

(1) Water Year - March through February of the following year.

(2) Total imported supply - all sources

(3) Metered deliveries to turnouts

(4) Measured deliveries to spreading basins

(5) Calculated from wetted area and measured pan evaporation

(6) Col 4 - Col 5

(7) Metered wellfield production plus farm wells

(8) Col 6 - Col 7

(9) Accumulated Col 7

(10) Exports from banking programs.

(11) Col 2 + Col 7 - Col 3 - Col 4 - Col 10

2/17/2007

**ARVIN-EDISON WATER STORAGE DISTRICT
2005 WATER YEAR GROSS SPREADING - AF**

MONTH	N1	NCSW GRAVITY	NCSW PRESSURE	SYCAMORE	TEJON GRAVITY	TEJON PRESSURE	TOTAL
MAR-05	89	4,715	2,448	6,947	3,554	3,969	21,722
APR	140	3,821	2,275	6,224	2,699	3,806	18,965
MAY	151	2,331	2,039	4,409	2,298	2,042	13,270
JUN	109	1,599	1,645	3,795	2,333	1,943	11,424
JUL	261	1,115	657	1,544	835	803	5,215
AUG	241	0	0	0	0	0	241
SEP	261	0	0	0	0	0	261
OCT	114	0	0	0	0	0	114
NOV	305	0	0	3,396	0	0	3,701
DEC	254	0	0	0	0	0	254
JAN-06	254	1,838	1,240	7,065	2,595	1,406	14,398
FEB	140	3,029	2,114	6,154	2,386	2,335	16,158
TOTAL	2,319	18,448	12,418	39,534	16,700	16,304	105,723
RATIO	2%	17%	12%	37%	16%	15%	100%

TOTAL	2,319		12,418			16,304	31,041
PRESSURE	7%		40%			53%	100%

*AS OF 2/29/2004

9/3/07

SECTION 3

BMP's FOR AG CONTRACTORS

Section 3: Best Management Practices (BMPs) for Agricultural Contractors

A. Critical Agricultural BMPs

1. Measure the volume of water delivered by the district to each turnout with devices that are operated and maintained to a reasonable degree of accuracy, under most conditions, to +/- 6 percent

Number of turnouts that are unmeasured or do not meet the standards listed above: 0

Number of measurement devices installed last year: 65

Number of measurement devices installed this year: 50

Number of measurement devices to be installed next year: 50

Types of Measurement Devices Being Installed	Accuracy	Total Installed During Current Year
Propeller meters	2%	50

2. Designate a water conservation coordinator to develop and implement the Plan and develop progress reports

Name: Steve Lewis Title: Staff Engineer

Address: 20401 E. Bear Mountain Blvd., Arvin, CA 93203

Telephone: (661) 854-5573 E-mail: slewis@aewsd.org

3. Provide or support the availability of water management services to water users
See Attachment J, Irrigation evaluations through the Mobile Lab.

a. On-Farm Evaluations

- 1) On farm irrigation and drainage system evaluations using a mobile lab type assessment

	Total in district	# surveyed last year	# surveyed in current year	# projected for next year	# projected 2 nd yr in future
Irrigated acre	111,602	333	333	350	350
Number of farms	156	5	5	5	5

- 2) Timely field and crop-specific water delivery information to the water user see Attachment J

- b. *Real-time and normal irrigation scheduling and crop ET information:* CIMIS station
See Attachment L-1.

- c. *Surface, ground, and drainage water quantity and quality data provided to water users*
See Attachment I for water quality. Other reports are available for upon request and presented to Board of Directors annually.

- d. *Agricultural water management educational programs and materials for farmers, staff, and the public*

Program	Co-Funders (If Any)	Yearly Targets
See Attachment J		

4. *Pricing structure - based at least in part on quantity delivered:* See rate table Attachment D

Evaluate the need for changes in policies of the institutions to which the district is subject
Environmental Regulations concerning water supplies adversely impact the District's water supply or prevent optimal scheduling of resources.

6. *Evaluate and improve efficiencies of district pumps:* Pump and motor testing: pumps found to be moving insufficient amounts of water are replaced or upgraded. There were 34 Pumps and 21 motors repaired or replaced in 2005.

B. Exemptible BMPs for Agricultural Contractors

(See Attachment B for examples of exemptible conditions)

1. Facilitate alternative land use

Drainage Characteristic	Acreage	Potential Alternate Uses
High water table (<5 feet)	0	
Poor drainage	0	
Ground water Selenium concentration > 50 ppb	0	
Poor productivity	0	

2. Facilitate use of available recycled urban wastewater that otherwise would not be used beneficially, meets all health and safety criteria, and does not cause harm to crops or soils

Sources of Recycled Urban Waste Water	AF/Y Available	AF/Y Currently Used in District
None		

3. Facilitate the financing of capital improvements for on-farm irrigation systems: Some assistance available through the Natural Resources Conservation Service, an agency of the United States Department of Agriculture, and the District directs inquiries (if any) to the appropriate agencies.

4. Incentive pricing

The District has been looking into incentive pricing, but has not yet reached a consensus on the details.

5. a) Line or pipe ditches and canals

Canal/Lateral (Reach)	Type of Improvement	Number of Miles in Reach	Estimated Seepage (AF/Y)	Accomplished/Planned Date
Arvin-Edison Canal	concrete liner	45	negligable	all canals lined

b) Regulatory reservoirs

Reservoir Name	Annual Spill in Section (AF/Y)	Estimated Spill Recovery (AF/Y)	Accomplished/Planned Date
Balancing Reservoir	2500	2500	2006

6. Increase flexibility in water ordering by, and delivery to, water users

See Attachment K – District Agricultural Water Order form. Also, continued informal internal discussion regarding improvements to delivery flexibility.

Construct and operate district spill and tailwater recovery systems

<i>Distribution System Lateral</i>	<i>Annual Spill (AF/Y)</i>	<i>Quantity Recovered and reused (AF/Y)</i>
All spillage is recoverable		
Total		

<i>Drainage System Lateral</i>	<i>Annual Drainage Outflow (AF/Y)</i>	<i>Quantity Recovered and reused (AF/Y)</i>
NA		
Total		

8. *Optimize conjunctive use of surface and ground water*

The district expanded its conjunctive use facilities by the addition of over 550 acres of new spreading and the addition of nine (9) new groundwater wells. Surface water is usually used first and as that supply diminishes, more groundwater is used. Also see Section 2 B4.

9. *Automate canal structures* : As a part of the District's South Canal Improvement Project, new or modified check structure designs incorporate automation for canal operations. SCADA programming will also allow the dispatcher to remotely operate canal check structures.

10. *Facilitate or promote water customer pump testing and evaluation*

See Attachment J, for services available through the North West Kern Resource Conservation District and the Natural Resources Conservation Service.

C. Provide a 3-Year Budget for Implementing BMPs

1. Amount actually spent during current year.

<i>BMP #</i>	<i>BMP Name</i>	<i>Actual Expenditure (not including staff time)</i>	<i>Staff Hours</i>
A1	Measurement	\$70,000	80
2	Conservation staff	\$1,000	80
3	On-farm evaluations / water delivery info	\$0	100
	Irrigation Scheduling	\$6,000	750
	Water quality	\$60,000	300
	Agricultural Education Program	\$0	0
4	Quantity pricing	\$0	40
5	Policy changes	\$0	10
6	Contractor's pumps	\$200,000	500
B1	Alternative land use	\$0	10
2	Urban recycled water use	\$0	0
3	Financing of on-farm improvements	\$0	0
4	Incentive pricing	\$0	0
5	Line or pipe canals/install reservoirs	\$50,000	120
6	Increase delivery flexibility	\$50,000	120
7	District spill/tailwater recovery systems	\$0	0
8	Optimize conjunctive use	\$0	40
9	Automate canal structures	\$100,000	100
10	Customer pump testing	\$0	0
<i>Total</i>		<i>\$537,000</i>	<i>2,178</i>

2. Projected budget summary for the next year.

<i>BMP #</i>	<i>BMP Name</i>	<i>Budgeted Expenditure (not including staff time)</i>	<i>Staff Hours</i>
A1	Measurement	\$70,000	80
2	Conservation staff	\$1,000	80
3	On-farm evaluations / water delivery info	\$0	100
	Irrigation Scheduling	\$0	0
	Water quality	\$60,000	300
	Agricultural Education Program	\$0	0
4	Quantity pricing	\$0	40
5	Policy changes	\$0	10
6	Contractor's pumps	\$200,000	500
B1	Alternative land use	\$0	10
2	Urban recycled water use	\$0	0
3	Financing of on-farm improvements	\$0	0
4	Incentive pricing	\$0	0
5	Line or pipe canals/install reservoirs	\$25,000	60
6	Increase delivery flexibility	\$25,000	60
7	District spill/tailwater recovery systems	\$0	0
8	Optimize conjunctive use	\$0	0

9	Automate canal structures	\$0	0
10	Customer pump testing	\$0	0
<i>Total</i>		\$381,000	1240

3. Projected budget summary for 3rd year.

<i>BMP #</i>	<i>BMP Name</i>	<i>Budgeted Expenditure (not including staff time)</i>	<i>Staff Hours</i>
A1	Measurement	\$70,000	80
2	Conservation staff	\$1,000	80
3	On-farm evaluations / water delivery info	\$0	100
	Irrigation Scheduling	\$0	750
	Water quality	\$90,000	500
	Agricultural Education Program	\$0	0
4	Quantity pricing	\$0	40
5	Policy changes	\$0	10
6	Contractor's pumps	\$200,000	500
B1	Alternative land use	\$0	10
2	Urban recycled water use	\$0	0
3	Financing of on-farm improvements	\$0	0
4	Incentive pricing	\$0	0
5	Line or pipe canals/install reservoirs	\$0	0
6	Increase delivery flexibility	\$0	0
7	District spill/tailwater recovery systems	\$0	0
8	Optimize conjunctive use	\$0	0
9	Automate canal structures	\$0	0
10	Customer pump testing	\$0	0
<i>Total</i>		\$361,000	2,070

D. Drainage Problem Area Programs

(for districts located in the drainage problem area, as defined in Attachment A)

The following programs have been incorporated in the district water conservation programs to improve conditions in the drainage problem areas. NA

<i>Activity</i>	<i>Program Description</i>	<i>Budget</i>	<i>Results</i>
<i>Source Control</i>			
<i>Land Retirement</i>			
<i>Drainage Water Treatment</i>			
<i>Drainage Water Reuse</i>			
<i>Shallow Groundwater Pumping</i>			
<i>Evaporation Ponds</i>			

The following programs have not been implemented because: Not needed - No drainage problems

E. District Quantifiable Objectives (QOs)

(QOs for each district are identified in the QO Agency document in the Planner, chapter 10)

Discussion of District participation in the QOs that apply to the District

<i>Name of QO</i>	<i>Related BMP</i>	<i>Interest in Outside Funding</i>	<i>Agency Role</i>
Decrease flows to salt sinks			not needed - none
Diversion flexibility to increase water			see planned changes in facilities
			Section 3 B8

SECTION 4
BMP's FOR URBAN CONTRACTORS
(Not Applicable)

Section 4: Best Management Practices for Urban Contractors

1. Water Survey Programs for Single-Family and Multi-Family Residential Customers Program description – NA

Enter the number of surveys conducted in passed years and the projected number for future years.

Residential type	yr target	2003	2004	2005	2006	2007	2008	2009
SF accts -	0							
MF units -	0							

2. Residential Plumbing Retrofit Program description – NA

Enter the number of showerheads distributed in the past and the projected number for future years

Residential type	yr target	2003	2004	2005	2006	2007	2008	2009
SF accts -	0							
MF units -	0							

3. System Water Audits, Leak Detection, and Repair Program description – NA

Enter the AF of water purchased and lost in the past and the projected amount in future years

	2003	2004	2005	2006	2007	2008	2009
Total Water AF							
Unaccounted for AF							
% UAW							

4. Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections (NOT EXEMPTIBLE) Program description – NA

Number of unmetered connections _____ 0
Number of connections not billed by quantity _____ 0

5. Large Landscape Conservation Programs and Incentives Program description – None

Enter the number of landscape budgets/audits in passed years & the projected number for future years

irrigation type	yr target	2003	2004	2005	2006	2007	2008	2009
Dedicated meters -		0	0	0	0	0	0	0

Mixed use meters -								
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j. *High-Efficiency Washing Machine Rebate Programs*
Program description – NA

Enter the number of rebates paid in passed years & the projected number for future years

\$ rebate	2003	2004	2005	2006	2007	2008	2009
\$ 0							

7. *Public Information Programs (Attach samples)*
NA

8. *School Education Programs (Attach samples)*
NA

9. *Conservation Programs for CII Accounts*
NA

Enter the number of surveys conducted in passed years & the projected number for future years

Customer type	yr target	2003	2004	2005	2006	2007	2008	2009
Comm accts -	0							
Indust. accts -	0							
Instit. accts -	0							

10. *Wholesale Agency Assistance Programs*
Program description – NA

11. *Conservation Pricing*
Program description – NA

12. *Conservation Coordinator*
NA

Name: _____ Title: _____

Address: _____

Telephone: _____ E-mail: _____

13. *Water Waste Prohibition*
NA

14. Residential ULFT Replacement Programs

Program description – None

Enter the number of toilets replaced in passed years and the projected number for future years.

Residential type	yr target	2003	2004	2005	2006	2007	2008	2009
SF accts -	0							
MF units -	0							

Provide a 3-Year Budget for Expenditures and Staff Effort for BMPs

Actual Current Year Expenditures

Year BMP #	BMP Name	Actual Expenditures (not including staff hours)	Staff Hours
1	Residential Water Audits	\$0	0
2	Residential Retrofit	\$0	0
3	System Water Audit and Leak Detection	Not WC budget	
4	Metering w/Commodity Rates	\$0	0
5	Landscape Water Audits	\$0	0
6	Washing Machine Rebates	\$0	0
7	Public Information	\$0	0
8	School Education Program	\$0	0
9	CII Conservation Programs	\$0	0
10	Wholesale Agency Programs	\$0	0
11	Conservation Pricing	\$0	0
12	Conservation Coordinator	\$0	0
13	Water Waste Prohibition	\$0	0
14	ULFT Program	\$0	0
	Total	\$0	0

Projected Budget for Next Year

Year BMP #	BMP Name	Actual Expenditures (not including staff hours)	Staff Hours
1	Residential Water Audits	\$0	0
2	Residential Retrofit	\$0	0
3	System Water Audit and Leak Detection	Not WC budget	
4	Metering w/Commodity Rates	\$0	0
5	Landscape Water Audits	\$0	0
6	Washing Machine Rebates	\$0	0
7	Public Information	\$0	0
8	School Education Program	\$0	0
9	CII Conservation Programs	\$0	0

10	Wholesale Agency Programs	\$0	0
11	Conservation Pricing	\$0	0
12	Conservation Coordinator	\$0	0
13	Water Waste Prohibition	\$0	0
14	ULFT Program	\$0	0
	<i>Total</i>	\$0	0

Projected Budget for 3rd Year

Year		Actual Expenditures	
BMP #	BMP Name	(not including staff hours)	Staff Hours
1	Residential Water Audits	\$0	0
2	Residential Retrofit	\$0	0
3	System Water Audit and Leak Detection	Not WC budget	
4	Metering w/Commodity Rates	\$0	0
5	Landscape Water Audits	\$0	0
6	Washing Machine Rebates	\$0	0
7	Public Information	\$0	0
8	School Education Program	\$0	0
9	CII Conservation Programs	\$0	0
10	Wholesale Agency Programs	\$0	0
11	Conservation Pricing	\$0	0
12	Conservation Coordinator	\$0	0
13	Water Waste Prohibition	\$0	0
14	ULFT Program	\$0	0
	<i>Total</i>	\$0	0

Attachment A

Information Required of Contractors Located in a Drainage Problem Area

Contractor's included in the drainage problem area, as identified in A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley (September 1990), are listed, by sub-area, below. If future editions of the drainage report revise the boundaries of a drainage problem area or other factors used to determine which districts are in a drainage problem area, Reclamation will revise Attachment A to conform with the current drainage report.

1. Reclamation districts in the **Grasslands subarea**: Broadview Water District, Central California Irrigation District, Del Puerto Water District, Firebaugh Canal Water District, Mercy Springs Water District, Pacheco Water District, Panoche Water District, San Luis Canal Company, and San Luis Water District.
2. Reclamation districts in the **Westlands subarea**: James Irrigation District, Tranquillity Irrigation District, and Westlands Water District.
3. Reclamation districts in the **Tulare subarea**: Alpaugh Irrigation District, Atwell Island Water District, Lower Tule River Irrigation District, and Pixley Irrigation District.
4. Reclamation districts in the **Kern subarea**: Alpaugh Irrigation District.

Contractors listed above shall describe which recommendations prescribed in A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley (September 1990) have been incorporated in their water conservation programs to improve conditions in drainage problem areas. These recommendations include:

1. Source Control
2. Land Retirement
3. Drainage Water Treatment
4. Drainage Water Reuse
5. Shallow Ground water Pumping
6. Evaporation Ponds

Provide a description and level of expenditure for each activity designed to address the recommendations of the San Joaquin Valley Drainage Program. Identify how implementation of the recommendations has or will substantially reduce deep percolation on drainage problem lands. Describe which recommendations have not been implemented and why.

Attachment B
Agricultural Exemptible BMPs

To establish that a BMP is not applicable to the district, the Plan should explain the reasons why the BMP does not apply to the district. This justification must be consistent with Section 1 of the Criteria entitled, "Describe the District." Examples of N/A for each exemptible BMP are listed below. This list is not all-inclusive.

Section 3. B. Exemptible BMPs for Agricultural Contractors

1. Facilitate Alternative Land Use - *N/A could include: Districts without irrigable lands that have exceptionally high water duties or whose irrigation does not contribute to significant problems.*
2. Facilitate use of available recycled water that otherwise would not be used beneficially, meets all health and safety criteria, and does not cause harm to crops or soils - *N/A could include: Completely piped systems that do not have delivery constraints.*
3. Facilitate the financing of capital improvements for on-farm irrigation systems - *None identified.*
4. Incentive pricing - *District that receives only class 2 water.*
5. a) Line or pipe ditches and canals - *N/A could include: Completely piped systems, unlined systems or sections or systems that are used as part of a planned conjunctive use program.*

b) Regulatory reservoirs - *N/A could include: Completely piped systems that do not have delivery constraints.*
6. Increase flexibility in water ordering by, and delivery to, the water users within operational limits - *None identified.*
7. Construct and operate district spill and tailwater recovery systems - *N/A could include: Completely piped systems that do not have delivery constraints.*
8. Optimize conjunctive use of surface and ground water - *N/A could include: Districts that do not overlie a useable ground water basin and neither the district or its customers pump or use ground water.*
9. Automate canal structures - *N/A could include: Completely piped systems that do not have delivery constraints.*

Attachment C
Quantifiable Objectives

Assess Quantifiable Objectives(QOs). CALFED is developing QOs that provide incentives for participation in implementing Water Management activities by water users including Contractors. These activities may or may not directly benefit the water user/Contractor. If there are CALFED QOs that apply to the geographic location of your district lands, identify the QOs that apply to the district and comment on potential for Contractor participation. Reclamation's Area Office and Regional Office will have the latest copy of QOs listed by Contractor. Evaluate and comment on any BMP or practice that is complementary, or could be complementary to the QOs in the District.

Attachment D

Crop List

barley
corn - field
oats
rice
sorghum
wheat
other cereals

alfalfa
clover
irrigated pasture
other hay
silage
other forage

cotton
hops
safflower
sugar beets
soybeans
other field crops

asparagus
beans
broccoli

cabbage
carrots
cauliflower
celery
corn
cucumbers
garlic
greens
lettuce
melons
onions
peas
peppers
potatoes
squash
tomatoes
other vegetables

Sudan grass
Bermuda grass
other grasses

apples
apricots
avocados

berries (all kinds)
cherries
grapefruit
lemon / limes
oranges / tangerines
dates
grapes
olives
peaches
pears
prunes / plums
strawberries
other fruits

almonds
pecans
pistachios
walnuts
other nut trees

ornamental nursery
joboba
other

Irrigation Methods List

Level basin
Furrow
Sprinkler
Low Volume
Multiple (combination of two methods)
Drip

District Water Inventory Tables

A. Ag Tables

Year of Data Enter data year here

Table 1

Surface Water Supply

2005 Month	Federal Ag Water (acre-feet)	Federal non-Ag Water. (acre-feet)	State Water (acre-feet)	Friant Floodwater (acre-feet)	Net Transfer & Exchange (acre-feet)	Upslope Drain Water (acre-feet)	Total (acre-feet)
Method							
March	28,928	0	0	0	16	0	28,944
April	34,390	0	0	0	60	0	34,450
May	27,191	0	0	0	93	0	27,284
June	32,349	0	0	0	14	0	32,363
July	22,231	0	0	0	5,718	0	27,949
August	14,982	0	0	0	8,170	0	23,152
September	12,998	0	0	0	3,388	0	16,386
October	6,561	0	0	0	2,612	0	9,173
November	0	0	0	0	9,030	0	9,030
December	2,161	0	0	0	37	0	2,198
January	16,190	0	0	0	1,718	0	17,908
February	24,608	0	0	0	0	0	24,608
TOTAL	222,589	0	0	0	30,856	0	253,445

Table 2
Ground Water Supply

2005 Month	District Groundwater (acre-feet)	Private Groundwater *(acre-feet)
Method		
March	0	8200
April	0	14400
May	0	22600
June	0	25400
July	0	25600
August	0	21900
September	0	14800
October	0	10900
November	174	3900
December	0	2100
January	0	2040
February	0	3000
TOTAL	174	154,840

*normally estimated

Table 3

Total Water Supply

2005 Month	Surface Water Total (acre-feet)	District Groundwater (acre-feet)	Recycled M&I (acre-feet)	Total District Water Supply (acre-feet)
Method				
March	28,944	0	0	28,944
April	34,450	0	0	34,450
May	27,284	0	0	27,284
June	32,363	0	0	32,363
July	27,949	0	0	27,949
August	23,152	0	0	23,152
September	16,386	0	0	16,386
October	9,173	0	0	9,173
November	9,030	174	0	9,204
December	2,198	0	0	2,198
January	17,908	0	0	17,908
February	24,608	0	0	24,608
TOTAL	253,445	174	0	253,619

*Recycled M&I Wastewater is treated urban wastewater that is used for agriculture.

Table 4

Distribution System

2005

Canal, Pipeline, Lateral, Reservoir	Length (feet)	Width (feet)	Surface Area (square feet)	Precipitation (acre-feet)	Evaporation (acre-feet)	Spillage (acre-feet)	Seepage (acre-feet)	Total (acre-feet)
Intake Canal	76,625	42	3,194,000	65	360	0	600	(895)
North Canal	66,300	48	3,183,000	65	359	0	640	(934)
South Canal	89,900	14	1,257,000	25	142	0	625	(741)
Spreading Basins	varies	varies	58,860,000	1,194	6,637	0	0	(5,443)
District Laterals	0	0	0	0	0	0	0	0
Arvin	15,800	0	0	0	0	0	0	0
Edison	128,900	0	0	0	0	0	0	0
Caliente	237,600	0	0	0	0	0	0	0
Tejon	116,200	0	0	0	0	0	0	0
Whitewolf	111,000	0	0	0	0	0	0	0
Mettler	132,000	0	0	0	0	0	0	0
TOTAL			66,494,000	1,348	7,498	0	1,865	(4,284)

Table 5

Crop Water Needs

2005 Crop Name	Area (crop acres)	Crop ET (AF/Ac)	Leaching Requirement (AF/Ac)	Cultural Practices (AF/Ac)	Effective Precipitation (AF/Ac)	Appl. Crop Water Use (acre-feet)
Grapes	29,566	2.1	0.009	0.40	0.2	67,614
Potatoes	0	0.0	0.000	0.40	0.2	0
Spring	16,150	1.5	0.012	0.40	0.2	28,261
Fall	2,616	1.0	0.012	0.40	0.2	3,244
Citrus	14,381	3.1	0.030	0.40	0.2	48,859
Wheat	8,722	1.7	0.010	0.40	0.2	17,161
Carrots	0	0.0	0.000	0.40	0.2	0
Spring	5,469	1.5	0.010	0.40	0.2	9,338
Fall	12,870	1.3	0.010	0.40	0.2	19,402
Cotton	3,098	2.8	0.010	0.40	0.2	9,317
Almonds	2,718	3.3	0.040	0.40	0.2	9,669
Onions	3,951	2.2	0.020	0.40	0.2	9,552
Peaches/Nectarines	2,985	3.2	0.030	0.40	0.2	10,410
Alfalfa	1,146	3.8	0.030	0.40	0.2	4,696
All other crops	22,001	2.2	0.020	0.40	0.2	53,847
	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	0	0
Crop Acres	125,673					291,370

Total Irrig. Acres 125,673 (If this number is larger than your known total, it may be due to double cropping)

Table 6

2005 District Water Inventory

Water Supply	Table 3		253,619
Riparian ET	(Distribution and Drain)	minus	0
Groundwater recharge	(intentional - ponds, injection)	minus	101,806
Seepage	Table 4	minus	1,865
Evaporation - Precipitation	Table 4	minus	7,498
Spillage	Table 4	minus	0
Transfers/exchanges/trades/wheeling	(into or out of the district)	plus/minus	0
Non-Agri deliveries	(delivered to non-ag customers)	minus	0
Water Available for sale to agricultural customers			142,450
<i>Compare the above line with the next line to help find data gaps</i>			
2005 Actual Agricultural Water Sales	From District Sales Records		139,033
Private Groundwater	Table 2	plus	154,840
Crop Water Needs	Table 5	minus	291,370
Drainwater outflow	(tail and tile not recycled)	minus	0
Percolation from Agricultural Land	(calculated)		2,503

Table 7

Influence on Groundwater and Saline Sink

2005

Agric Land Deep Perc + Seepage + Recharge - Groundwater Pumping = District Influence on	105,723
Estimated actual change in ground water storage, including natural recharge)	0
Irrigated Acres (from Table 5)	125,673
Irrigated acres over a perched water table	0
Irrigated acres draining to a saline sink	0
Portion of percolation from agri seeping to a perched water table	0
Portion of percolation from agri seeping to a saline sink	0
Portion of On-Farm Drain water flowing to a perched water table/saline sink	0
Portion of Dist. Sys. seep/leaks/spills to perched water table/saline sink	0
Total (AF) flowing to a perched water table and saline sink	0

Table 8

Annual Water Quantities Delivered Under Each Right or Contract²

Year ¹	Federal Ag Water (acre-feet)	Federal non-Ag Water. (acre-feet)	State Water (acre-feet)	Friant Floodwater (acre-feet)	Net Transfer & Exchange (acre-feet)	Upslope Drain Water (acre-feet)	Total (acre-feet)
1996	203,198	0	0	0	28,613	0	231,811
1997	240,839	0	0	0	17,393	0	258,232
1998	71,168	0	0	50,622	91,407	0	213,197
1999	115,055	0	0	0	136,287	0	251,342
2000	200,809	0	0	0	56,398	0	257,207
2001	59,138	0	0	0	(11,932)	0	47,206
2002	67,387	0	0	0	31,614	0	99,001
2003	133,224	0	0	0	37,991	0	171,215
2004	122,382	0	0	0	(13,878)	0	108,504
2005	220,860	0	0	0	32,585	0	253,445
Total	1,434,060	0	0	50,622	406,478	0	1,891,160
Average	143,406	0	0	5,062	40,648	0	189,116

¹ Water Year - March to February

² Arvin-Edison Water Storage District has only one right/contract for water - its Friant Division CVP contract for Class 1 and Class 2 supply.

This summary reflects Arvin's historic efforts to reregulate that supply to meet a relatively fixed irrigation demand.

B. Urban Tables
(Not Applicable)

Year of Data [Enter data year here](#)

Table 1

Surface Water Supply

2005 Month	Federal		State Water		Local Water		Other Water		Total
	Urban Water (acre-feet)	Federal Agric. (acre-feet)	(acre-feet)	(acre-feet)	(acre-feet)	(define)	(acre-feet)	(acre-feet)	
January	0							0	0
February	0							0	0
March	0							0	0
April	0							0	0
May	0							0	0
June	0							0	0
July	0							0	0
August	0							0	0
September	0							0	0
October	0							0	0
November	0							0	0
December	0							0	0
TOTAL	0	0	0	0	0	0	0	0	0

ATTACHMENTS

ATTACHMENT

A-1

BEFORE THE BOARD OF DIRECTORS OF THE
ARVIN-EDISON WATER STORAGE DISTRICT

IN THE MATTER OF:

RESOLUTION NO. 08-19

APPROVING A WATER MANAGEMENT PLAN UPDATE

WHEREAS, the District prepared a "Water Management Plan" pursuant to the guidelines of the United States Department of the Interior Bureau of Reclamation (USBR) and the Board approved such plan on February 13, 2001; and

WHEREAS, the USBR, in accordance with the guidelines, requires that their Contractors re-evaluate and re-submit their plans every five (5) years; and

WHEREAS, District staff and consultants have prepared a "Water Management Plan Update" in accordance with the USBR's current criteria.

NOW, THEREFORE, BE IT RESOLVED that this Board of Directors has approved the "Water Management Plan Update" and directs that a copy of same, together with this resolution be forwarded to the USBR.

All the foregoing being on motion of Director, Valpredo seconded by Director, Lehr and authorized by the following vote, to wit:

AYES: Directors' Frick, Moore, Giumarra, Camp, Pascoe, Johnston, Lehr, and Valpredo.

NOES: None


ABSTAIN: None

ABSENT: Director Fanucchi.

I HEREBY CERTIFY that the foregoing resolution is the resolution of said District as duly passed and adopted by said Board of Directors on the 9th day of September 2008.

WITNESS my hand and seal of said Board of Directors this 9th day of September 2008.





JOHN C. MOORE, Secretary-Treasurer
of the Board of Directors

ATTACHMENT

A

Arvin-Edison Water Storage District
131,660 Acres

Forrest Frick Pumping Plant

North Canal Balancing Reservoir

North Canal Spreading Works

Sycamore Spreading Works

District Headquarters

Tejon Spreading Works

Spillway Basin

Legend

AEWSD Boundary

AEWSD Canal System

Discharge Pipeline

Intake Canal

Intertie Pipeline

North Canal

South Canal

AEWSD Facilities

District Headquarters

Forrest Frick Pumping Plant

North Canal Balancing Reservoir

North Canal Spreading Works

Spillway Basin

Sycamore Spreading Works

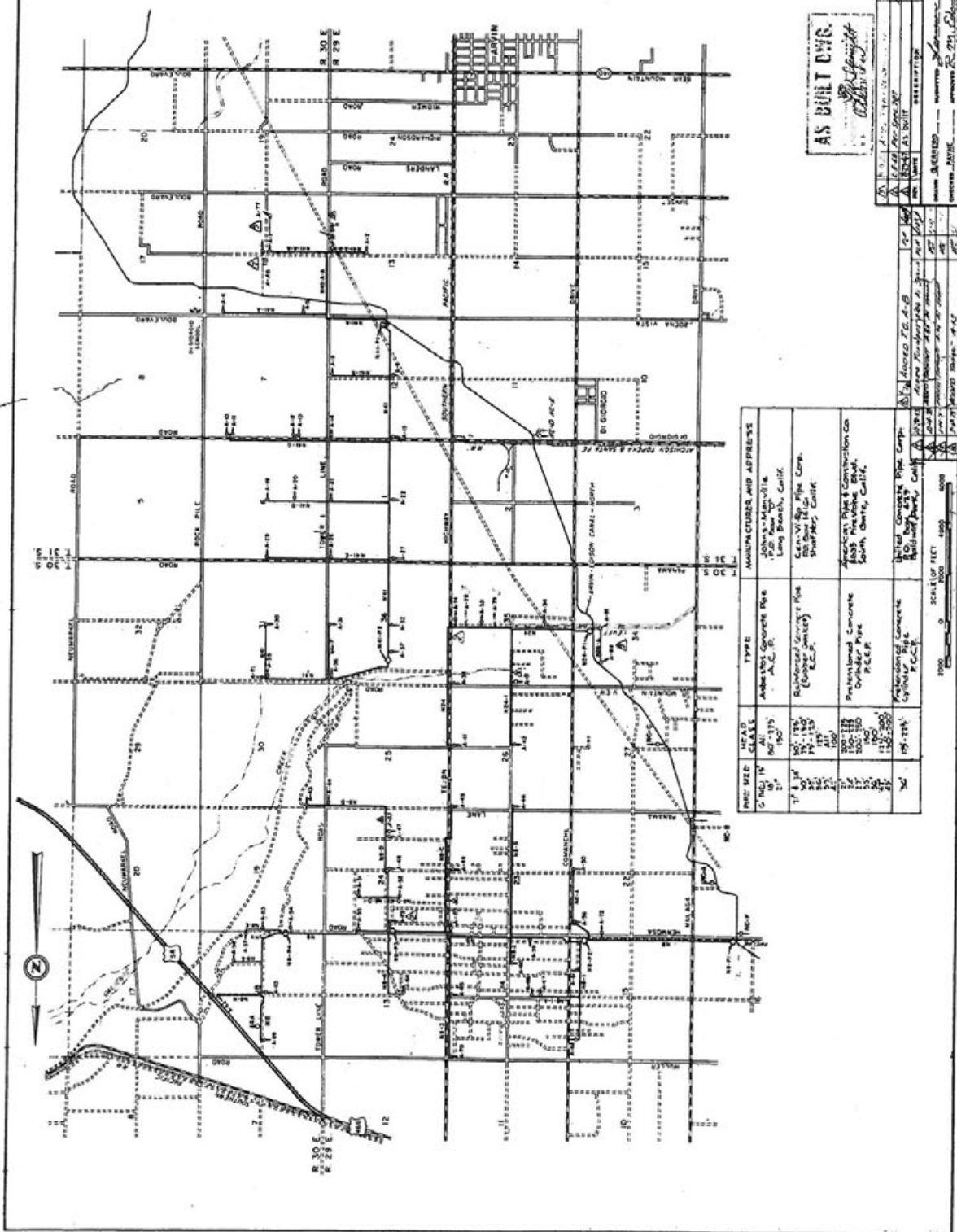
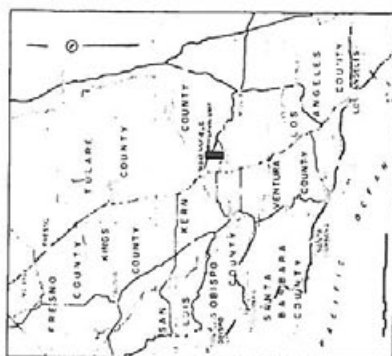
Tejon Spreading Works

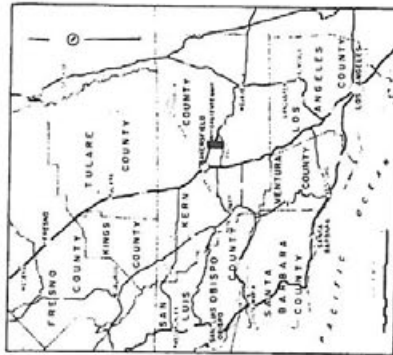


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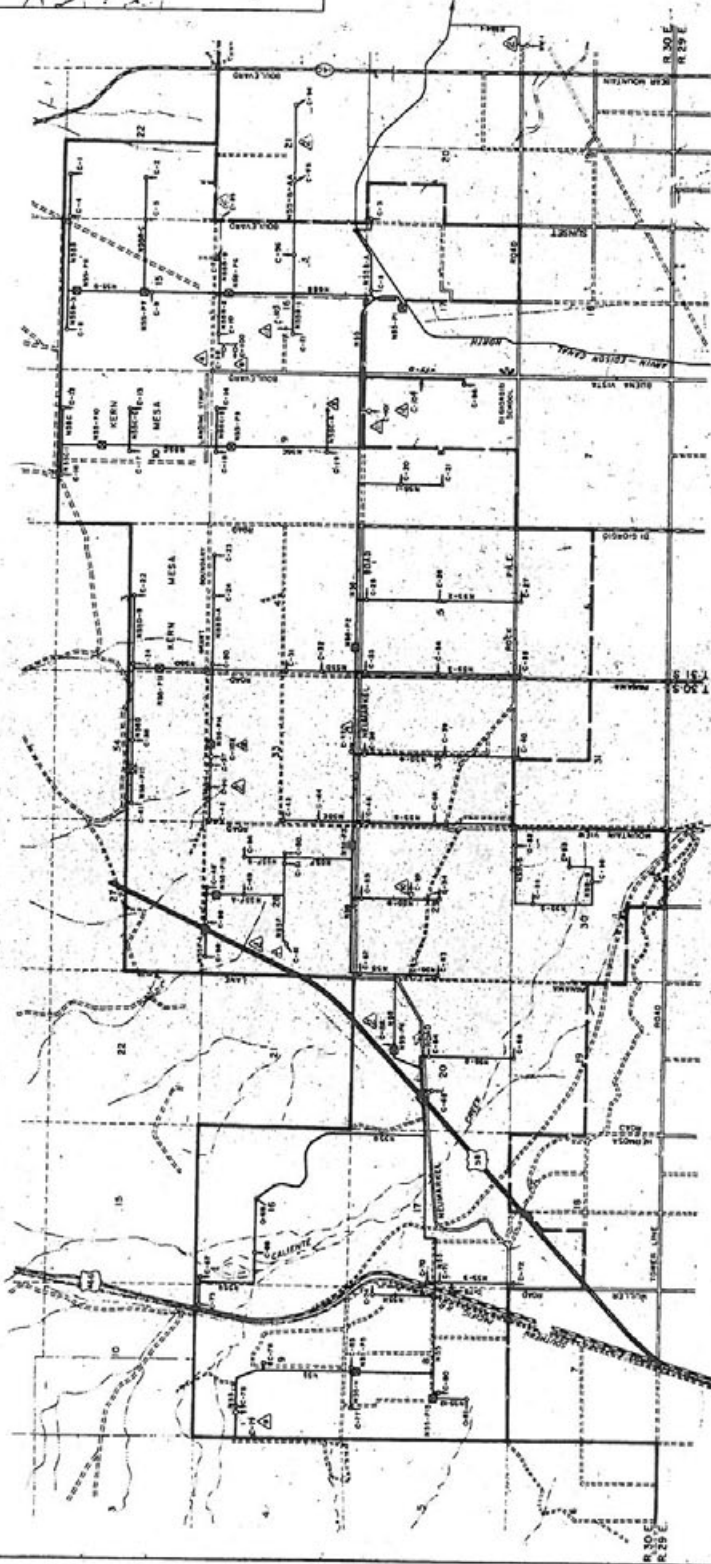


AEWSD Proximity Map





VICINITY MAP

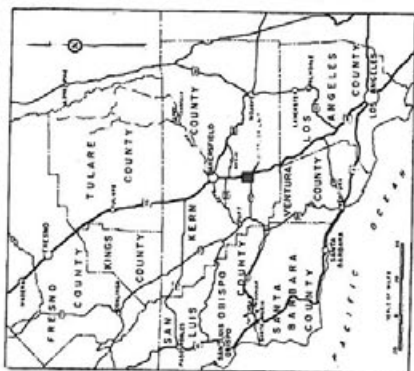


PIPE SIZE	PIPE TYPE	MANUFACTURER
4" through 18" x 24"	A.C.P. (Asbestos Cement Pipe)	Johns-Manville Pipe Division Long Beach, California
24" through 36"	P.C.C.P. (Prestressed Concrete Cylinder Pipe)	Long Beach, California Southern California 4615 Firestone Boulevard South Gate, California 90280
36" through 60"	P.C.C.P. (Prestressed Concrete Cylinder Pipe)	United Concrete Pipe Corporation 18041 East Line Ave. Bullhead City, California 91706

AS BUILT

NO.	DESCRIPTION	DATE	BY	CHECKED
1	DESIGN	1965	J. E. DUNN	J. E. DUNN
2	CONSTRUCTION	1965	J. E. DUNN	J. E. DUNN
3	AS BUILT	1965	J. E. DUNN	J. E. DUNN

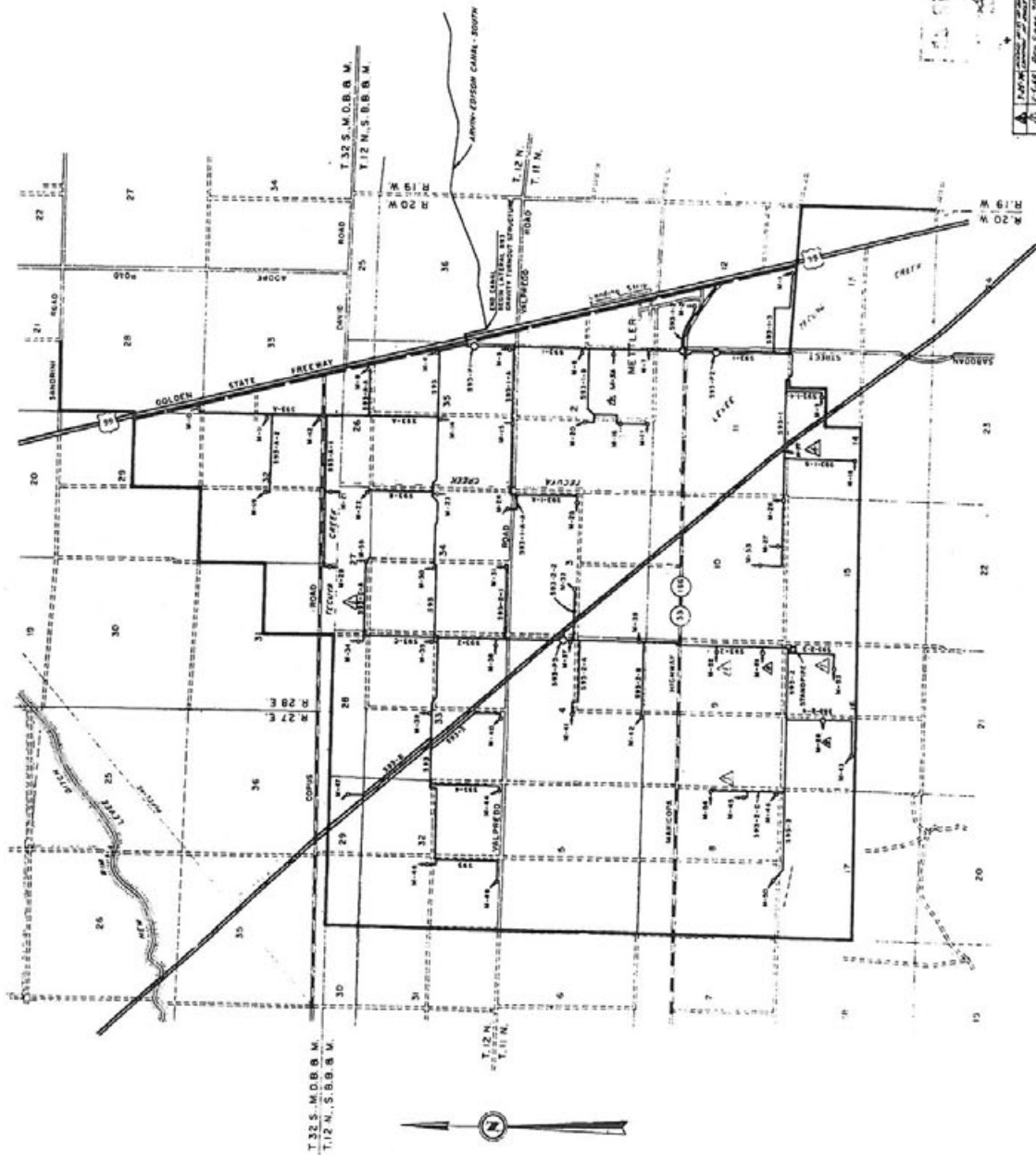
ARVIN EDISON WATER STORAGE DISTRICT	
CALIENTE UNIT	
LOCATION MAP	
BOOKMAN-EDGEMORE ENGINEERING, INC.	
DEC 5 1965	CL-1009



VICINITY MAP

LEGEND

- DISTRICT BOUNDARY
- UNIT BOUNDARY
- LATERAL PIPELINE
- PUMPING PLANT
- FARM DELIVERY
- STANDPIPE



ARVIN-EDISON WATER STORAGE DISTRICT

METTLER UNIT

LOCATION MAP

NOV 23, 1966

MOORE-EDMONSON ENGINEERING, INC.

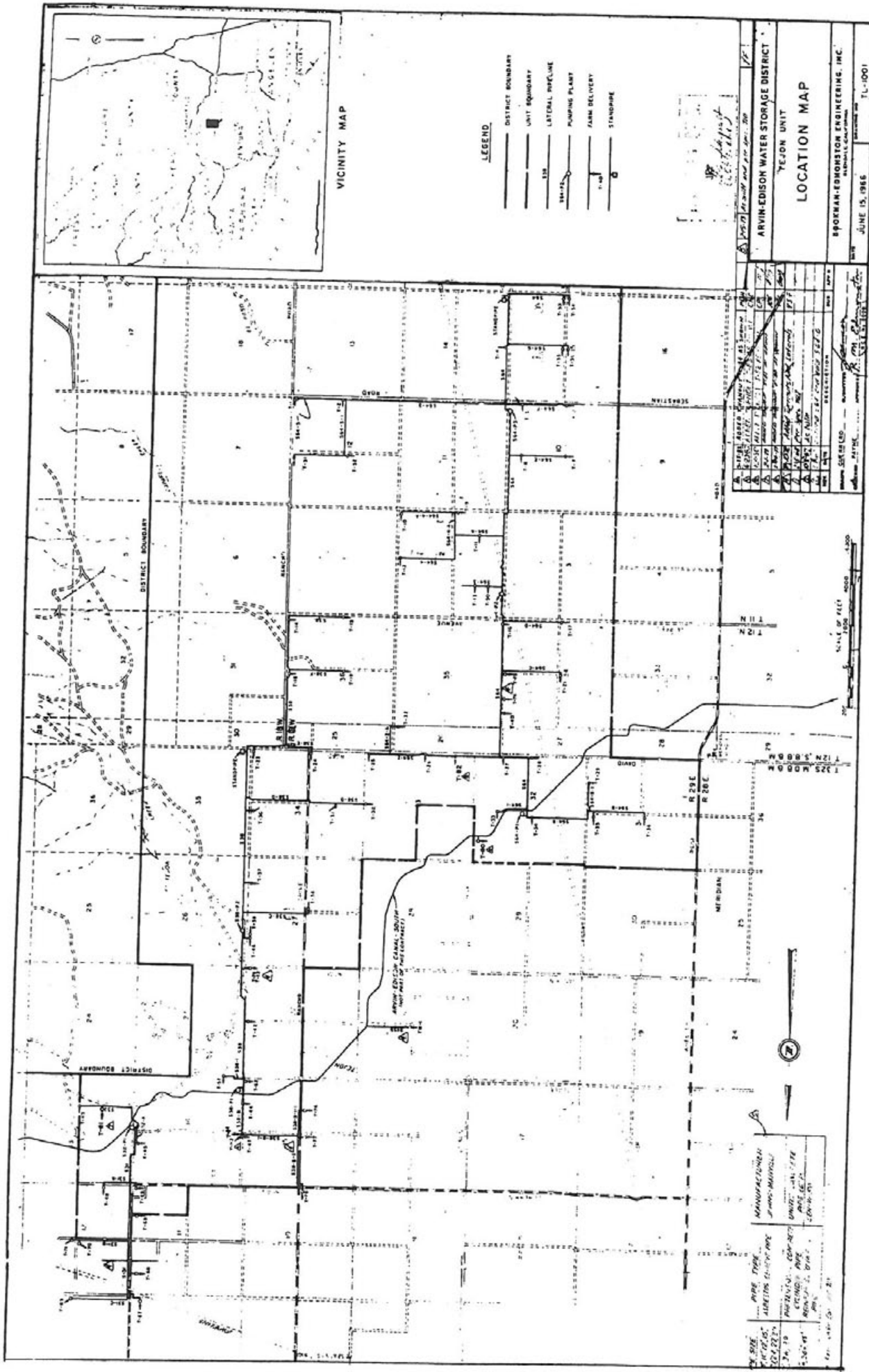
DATE

NOV 23, 1966

ML-1001

NO.	DATE	DESCRIPTION	BY	CHKD.
1	11-23-66	PREPARED FOR SUBMITTAL	W. J. MOORE	
2	11-23-66	REVISION	W. J. MOORE	
3	11-23-66	REVISION	W. J. MOORE	
4	11-23-66	REVISION	W. J. MOORE	
5	11-23-66	REVISION	W. J. MOORE	
6	11-23-66	REVISION	W. J. MOORE	
7	11-23-66	REVISION	W. J. MOORE	
8	11-23-66	REVISION	W. J. MOORE	
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10	11-23-66	REVISION	W. J. MOORE	

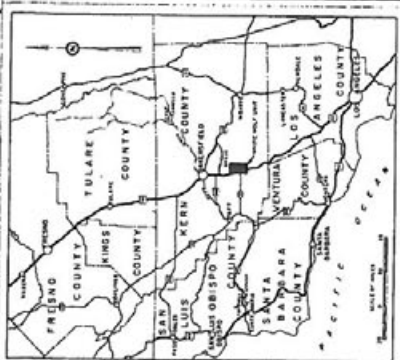
SCALE: 1" = 1/2 MILE



DISTRICT BOUNDARY	
---	DISTRICT BOUNDARY
UNIT BOUNDARY	
---	UNIT BOUNDARY
LATERAL PIPELINE	
---	LATERAL PIPELINE
PUMPING PLANT	
---	PUMPING PLANT
FARM DELIVERY	
---	FARM DELIVERY
STANDPIPE	
---	STANDPIPE

VICINITY MAP	
---	VICINITY MAP
LOCATION MAP	
---	LOCATION MAP
ARVIN-EDISON WATER STORAGE DISTRICT	
---	ARVIN-EDISON WATER STORAGE DISTRICT
YEJON UNIT	
---	YEJON UNIT
SPOKANE-EDMONSTON ENGINEERING, INC.	
---	SPOKANE-EDMONSTON ENGINEERING, INC.
JUNE 15, 1956	
---	JUNE 15, 1956
7L-0001	
---	7L-0001

MANUFACTURING	
---	MANUFACTURING
PUMP TYPE	
---	PUMP TYPE
PUMPING PLANT	
---	PUMPING PLANT
FARM DELIVERY	
---	FARM DELIVERY
STANDPIPE	
---	STANDPIPE

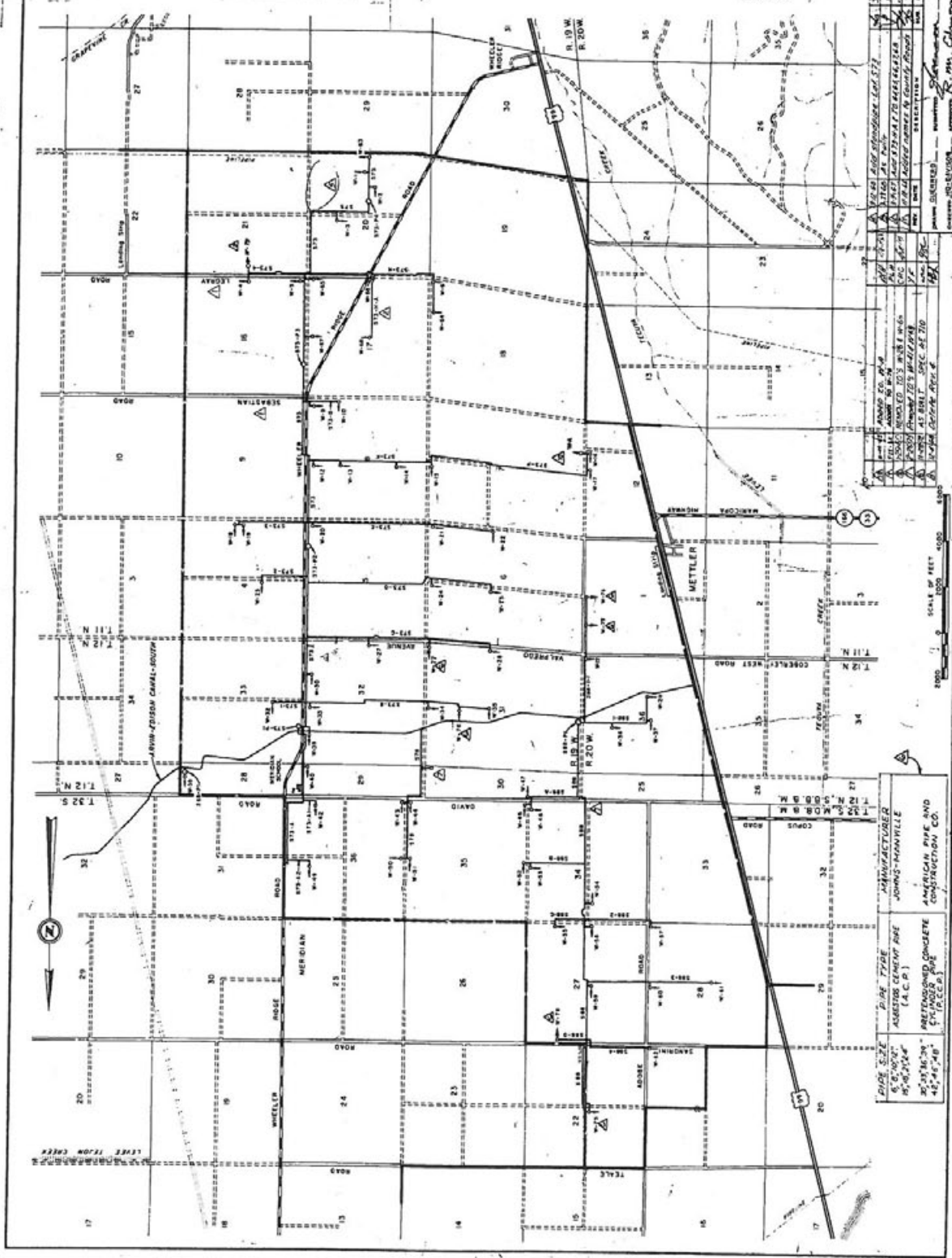


LEGEND

- DISTRICT BOUNDARY
- UNIT BOUNDARY
- LATERAL PIPELINE
- PUMPING PLANT
- FARM DELIVERY

AS BUILT C.W.G.
 BY: *[Signature]*
 DATE: *[Date]*

ARVIN-EDISON WATER STORAGE DISTRICT
 WHITE WOLF UNIT
LOCATION MAP
 BOKRAH-EDWARDS ENGINEERING, INC.
 SEPT 15, 1966



NO.	DATE	DESCRIPTION	BY	CHECKED
1	10/1/66	AS BUILT C.W.G.	<i>[Signature]</i>	<i>[Signature]</i>
2	10/1/66	AS BUILT C.W.G.	<i>[Signature]</i>	<i>[Signature]</i>
3	10/1/66	AS BUILT C.W.G.	<i>[Signature]</i>	<i>[Signature]</i>
4	10/1/66	AS BUILT C.W.G.	<i>[Signature]</i>	<i>[Signature]</i>
5	10/1/66	AS BUILT C.W.G.	<i>[Signature]</i>	<i>[Signature]</i>

DATE	SIZE	TYPE	MANUFACTURER
10/1/66	12" x 12"	ASBESTOS CEMENT PIPE (A.C.P.)	JOHN-MAHAR
10/1/66	12" x 12"	PRECAST CONCRETE	AMERICAN PIPE AND CONSTRUCTION CO.
10/1/66	12" x 12"	PRECAST CONCRETE	AMERICAN PIPE AND CONSTRUCTION CO.

SCALE OF FEET
 0 100 200 300 400 500

ATTACHMENT

B

General Soil Map

Soil Survey of Kern County, Northeastern Part and Southeastern Part of Tulare County, California

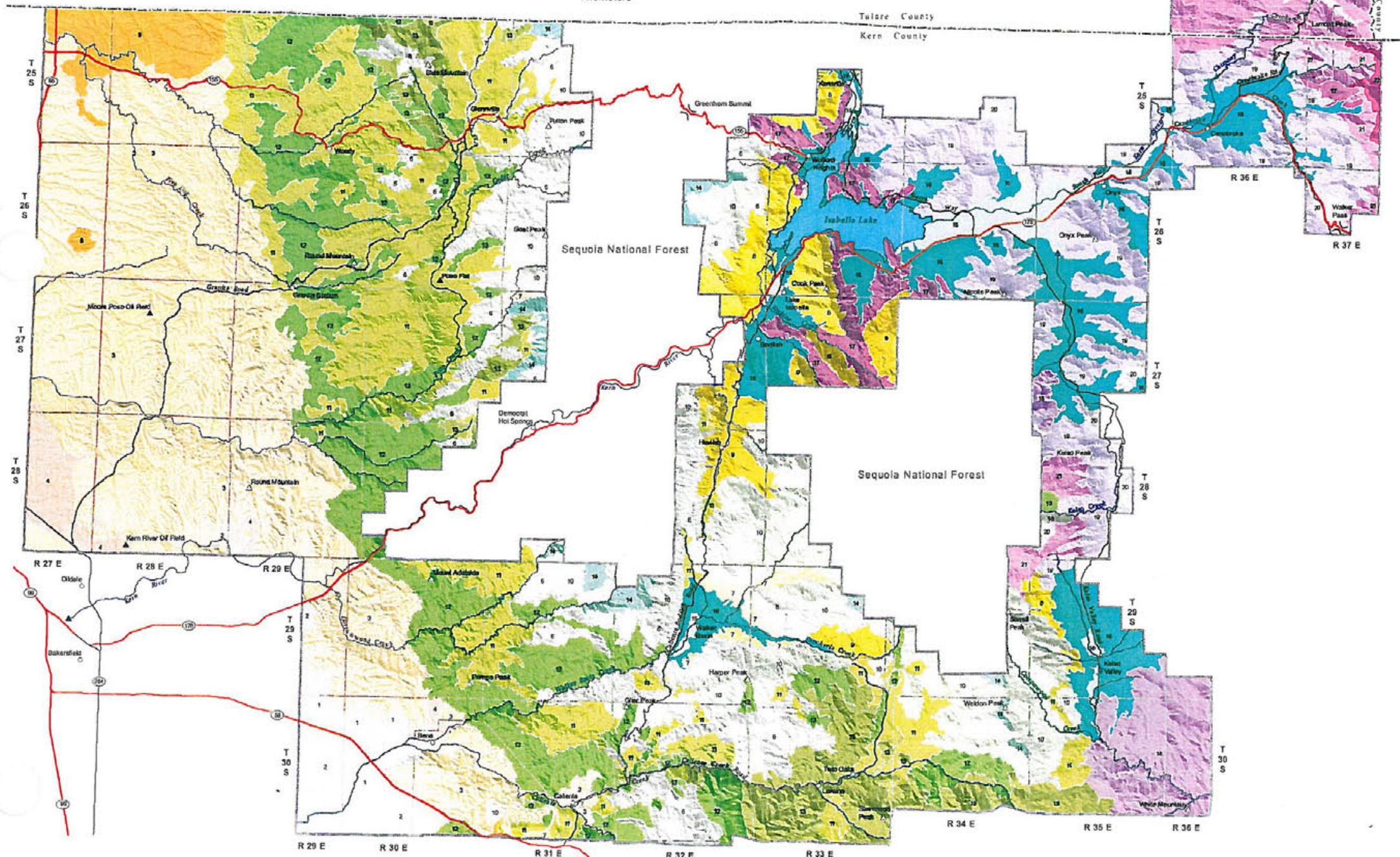
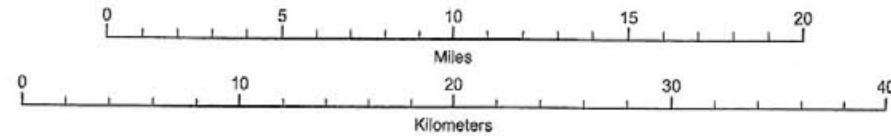
National Cooperative Soil Survey Partners

United States Department of Agriculture
Natural Resources Conservation Service

United States Department of the Interior
Bureau of Land Management

State of California
Department of Conservation

Regents of the University of California
Agriculture and Natural Resources
(Agricultural Experiment Station)



Soil Legend *

SOILS ON FLOOD PLAINS, ALLUVIAL FANS, STREAM TERRACES AND FAN REMNANTS OF THE SOUTHEASTERN SAN JOAQUIN VALLEY

- 1 Calicreek-Whitewolf
- 2 Delano-Pleito-Hesperia

SOILS ON ALLUVIAL FANS, STREAM TERRACES AND FAN REMNANTS OF THE SOUTHEASTERN SAN JOAQUIN VALLEY

- 3 Chanac-Pleito
- 4 Premier-Haplodurids-Delano
- 5 Delvar-Pleito-Centerville

SOILS ON HILLSLOPES, MOUNTAIN SLOPES, FLOOD PLAINS, STREAM TERRACES, ALLUVIAL FANS AND FAN REMNANTS ON THE WESTERN AND CENTRAL SLOPES OF THE SOUTHERN SIERRA NEVADA AND GREENHORN RANGES

- 6 Tweedy-Tunis
- 7 Havala-Steuber
- 8 Kernville-Faycreek-Rock outcrop
- 9 Hyle-Erskine-Sorrell
- 10 Tollhouse-Sorrell-Rock outcrop
- 11 Arujo-Walong
- 12 Walong-Vista
- 13 Strahle-Tweedy-Sesame
- 14 Edmundston-Tollhouse-Sorrell

SOILS ON MOUNTAIN VALLEYS, FLOOD PLAINS, DEPRESSIONS, STREAM TERRACES, INSET FANS, FAN APRONS, ALLUVIAL FANS, FAN PIEDMONTS AND FAN REMNANTS OF THE EASTERN SLOPES OF THE SOUTHERN SIERRA NEVADA RANGE PRIMARILY NEAR ISABELLA LAKE IN SOUTH FORK VALLEY

- 15 Kernfork-Kelval
- 16 Inyo-Chollawell

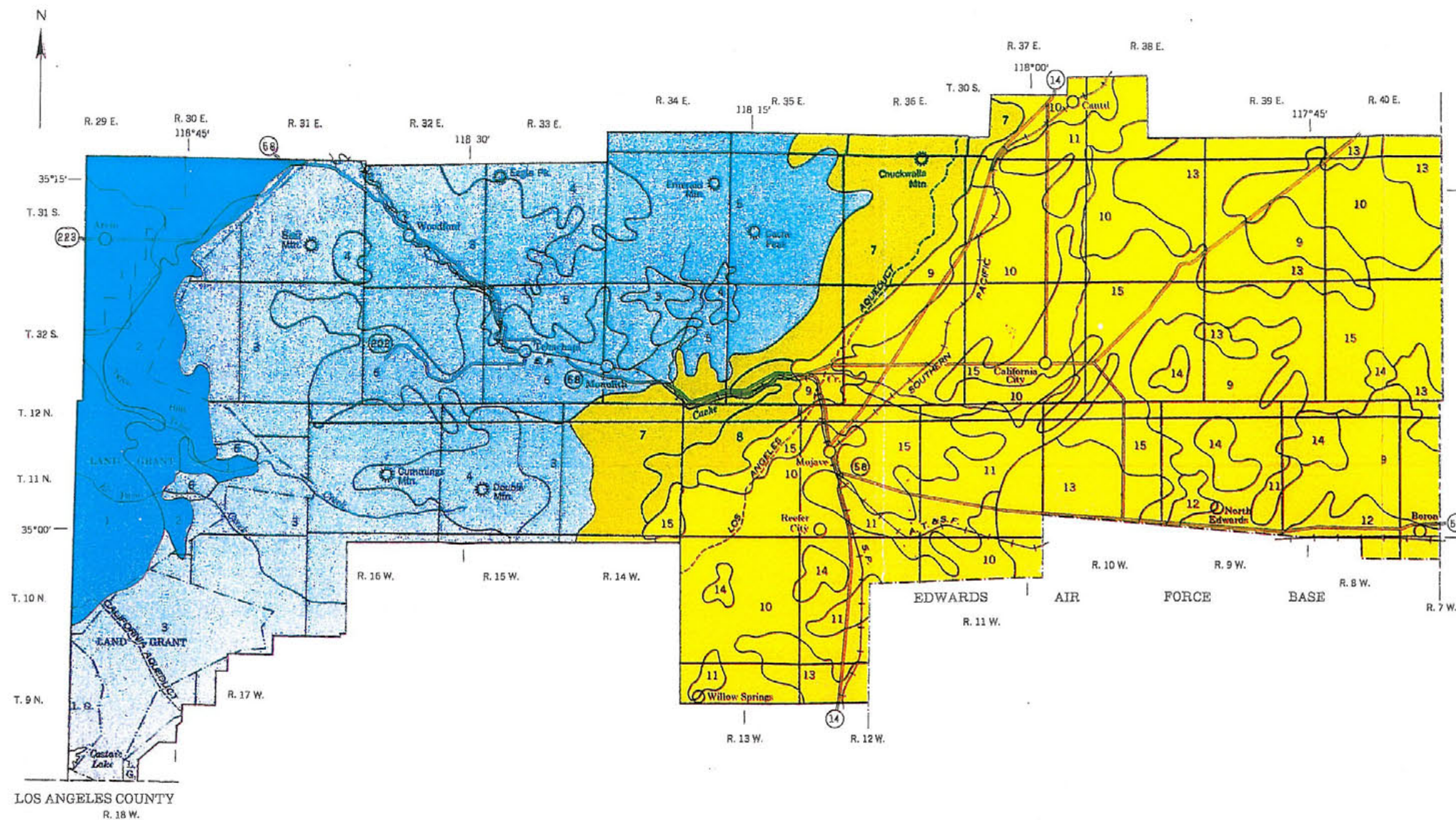
SOILS ON HILLSLOPES AND MOUNTAIN SLOPES OF THE EASTERN SLOPES OF THE SOUTHERN SIERRA NEVADA RANGE

- 17 Stineway-Kiscove
- 18 Hoffman-Tips
- 19 Xyno-Canebrake
- 20 Sacatar-Wortley
- 21 Canebrake-Scodie-Deadfoot
- 22 Tunawee-Kenypeak

* The units on this legend are described in the text under the heading "General Soil Map Units."



Scale: 1:170,000



MAP UNITS

SOILS ON ALLUVIAL FANS, FLOOD PLAINS, AND TERRACES ON THE EASTERN EDGE OF THE SAN JOAQUIN VALLEY

- 1 Hesperia-Arvin-Whitewolf: Very deep, nearly level to moderately sloping, well drained and somewhat excessively drained soils; on alluvial fans, flood plains, and stream terraces
- 2 Chanac-Pleito-Badlands: Very deep, gently sloping to steep, well drained soils on old dissected terraces; and Badlands

SOILS ON UPLANDS AND IN VALLEYS OF THE SIERRA NEVADA AND TEHACHAPI MOUNTAINS

- 3 Walong-Anaverde-Edmundston: Very deep to moderately deep, hilly to very steep, well drained soils underlain by weathered granite or schist; on mountainous uplands
- 4 Edmundston-Tollhouse-Godde: Deep and shallow, steep to very steep, well drained and somewhat excessively drained soils underlain by weathered granite; on mountainous uplands
- 5 Tweedy-Rock outcrop-Edmundston: Rock outcrop and deep and moderately deep, steep and very steep, well drained soils underlain by weathered granite or schist; on mountainous uplands
- 6 Steuber-Tehachapi-Havala: Very deep, nearly level to hilly, well drained soils; on alluvial fans, stream flood plains, and terraces of the mountain valleys

SOILS ON THE EASTERN FOOT SLOPES OF THE SIERRA NEVADA AND TEHACHAPI MOUNTAINS

- 7 Rock outcrop-Jawbone-Xeric Torriorthents: Rock outcrop and shallow, hilly to very steep, well drained and somewhat excessively drained soils; on mountainous uplands
- 8 Pajuela-Whitewolf: Very deep, nearly level to steep, somewhat excessively drained soils; on old stream terraces, alluvial fans, and flood plains

SOILS OF THE MOJAVE DESERT

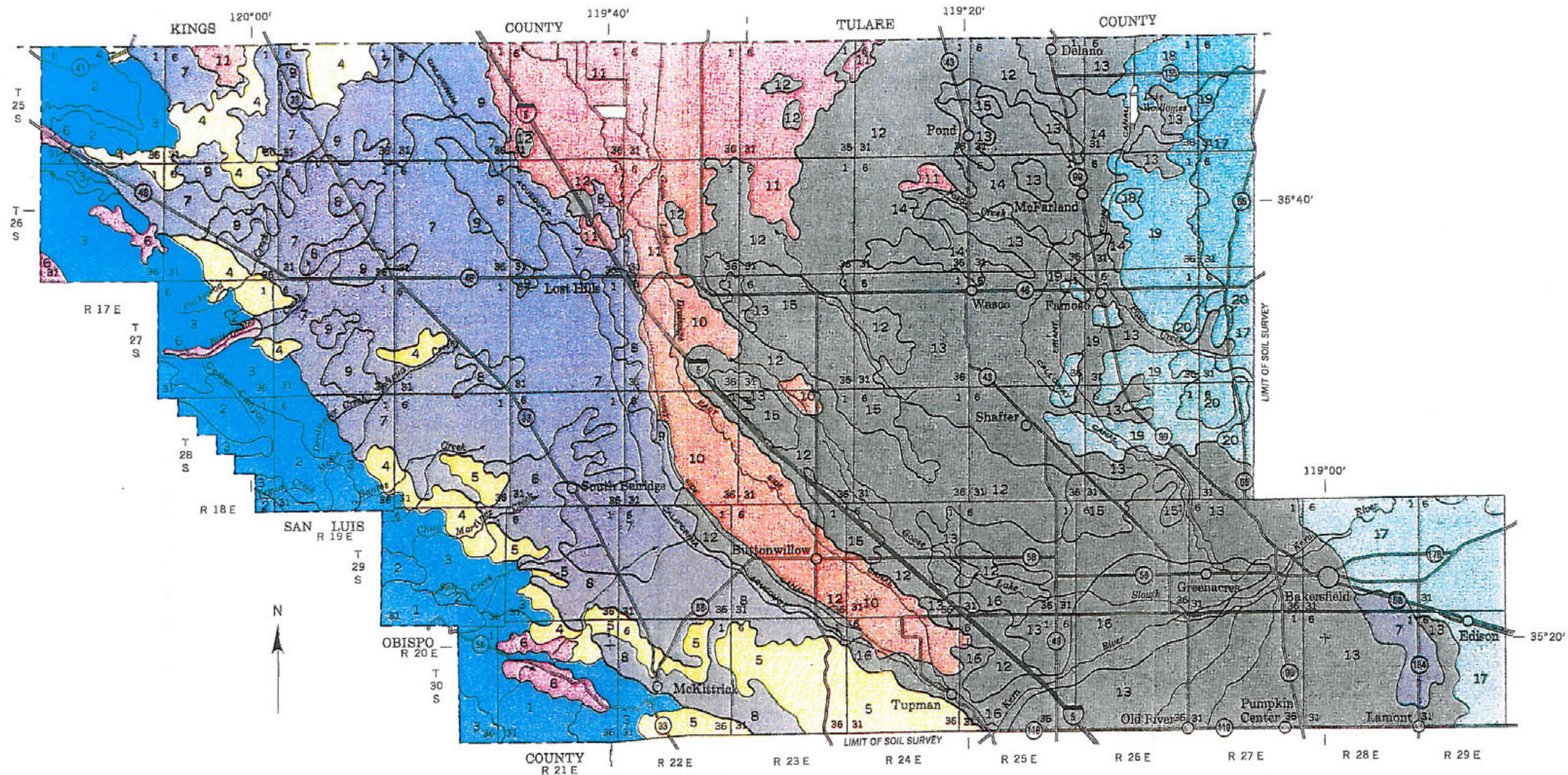
- 9 Cajon-Arizo-Alko: Very deep and shallow, nearly level to strongly sloping, well drained and excessively drained soils; on alluvial fans, alluvial plains, and old terraces
- 10 Cajon: Very deep, nearly level to strongly sloping, somewhat excessively drained soils; on alluvial fans and plains
- 11 Rosamond-DeStazo: Very deep, nearly level to moderately sloping, well drained soils; on flood plains and in basins
- 12 Norob-Neuralia: Very deep and deep, nearly level and gently sloping, well drained soils; on alluvial fans and plains
- 13 Randsburg-Muroc: Shallow, gently sloping to strongly sloping, well drained soils; on low pediments
- 14 Torriorthents-Rock outcrop: Shallow and very shallow, very steep, well drained soils and Rock outcrop; on mountainous ridges
- 15 Garlock-Neuralia: Very deep and deep, nearly level to moderately sloping, well drained soils; on old stream terraces, alluvial fans, and alluvial plains

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
UNIVERSITY OF CALIFORNIA AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP KERN COUNTY, CALIFORNIA, SOUTHEASTERN PART

Scale 1:380,160
1 0 1 2 3 4 5 Miles

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

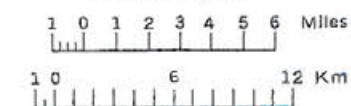


SECTIONALIZED
TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
UNIVERSITY OF CALIFORNIA
CALIFORNIA AGRICULTURAL EXPERIMENT STATION
GENERAL SOIL MAP
KERN COUNTY, CALIFORNIA
NORTHWESTERN PART

Scale 1:380,160



Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

LEGEND

SOILS ON HILLS AND MOUNTAINS OF THE TEMBLOR AND DIABLO RANGES

1 Aramburu-Reward: Moderately deep and deep, hilly to very steep, well drained shaly loam and very shaly clay loam

2 Aido-Ayar-Hillbrick: Shallow to deep, rolling to very steep, well drained clay, silty clay, and sandy loam

3 Hillbrick-Kilmer-Mendi: Shallow to deep, gently rolling to very steep, well drained sandy loam and loam

SOILS ON THE FOOTHILLS OF THE TEMBLOR AND DIABLO RANGES

4 Kettleman-Bitterwater-Delgado: Shallow to deep, rolling to very steep, somewhat excessively drained and well drained soils underlain by weathered sandstone or shale

5 Elkhills: Deep, rolling to steep, well drained soils that formed in mixed, stratified alluvium

SOILS IN THE MOUNTAIN VALLEYS OF THE TEMBLOR RANGE

Pottinger-Polonio: Deep, undulating to rolling, well drained soils; on alluvial fans and terraces

SOILS MAINLY ON ALLUVIAL FANS, ALLUVIAL PLAINS, AND TERRACES IN THE WESTERN PART OF THE SAN JOAQUIN VALLEY

7 Panoche-Milham-Kimberlina: Deep, nearly level to moderately sloping, well drained clay loam, sandy loam, and fine sandy loam; on alluvial fans, alluvial plains, and terraces

Kimberlina: Deep, nearly level to moderately sloping, well drained fine sandy loam; on recent alluvial fans and alluvial plains

9 Twisselman-Yribarren-Panoche: Deep, nearly level to gently rolling, well drained clay, loam, and clay loam; on alluvial fans

SOILS MAINLY IN BASINS OF THE SAN JOAQUIN VALLEY

10 Lokern-Buttonwillow: Deep, nearly level, somewhat poorly drained clay

Nahrub-Lethent-Twisselman: Deep, nearly level, well drained to somewhat poorly drained clay and silt loam

SOILS MAINLY ON ALLUVIAL FANS, ALLUVIAL PLAINS, BASIN RIMS, AND FLOOD PLAINS IN THE EASTERN PART OF THE SAN JOAQUIN VALLEY

12 Garces-Panoche: Deep, nearly level, saline-alkali, well drained silt loam and clay loam; on basin rims, alluvial fans, and alluvial plains

Kimberlina-Wasco: Deep, nearly level, well drained fine sandy loam and sandy loam; on alluvial fans and alluvial plains

McFarland: Deep, nearly level, well drained loam; on alluvial fans and flood plains

Milham: Deep, nearly level, well drained sandy loam; on old alluvial fans and alluvial plains

13 Cajon-Westhaven: Deep, nearly level and gently sloping, well drained and somewhat excessively drained loamy sand and fine sandy loam; on flood plains and alluvial fans

SOILS ON TERRACES IN THE EASTERN PART OF THE SAN JOAQUIN VALLEY

Delano-Chanac: Deep, nearly level to hilly, well drained sandy loam and clay loam

Exeter: Moderately deep, nearly level to gently rolling, well drained sandy loam that has a cemented layer

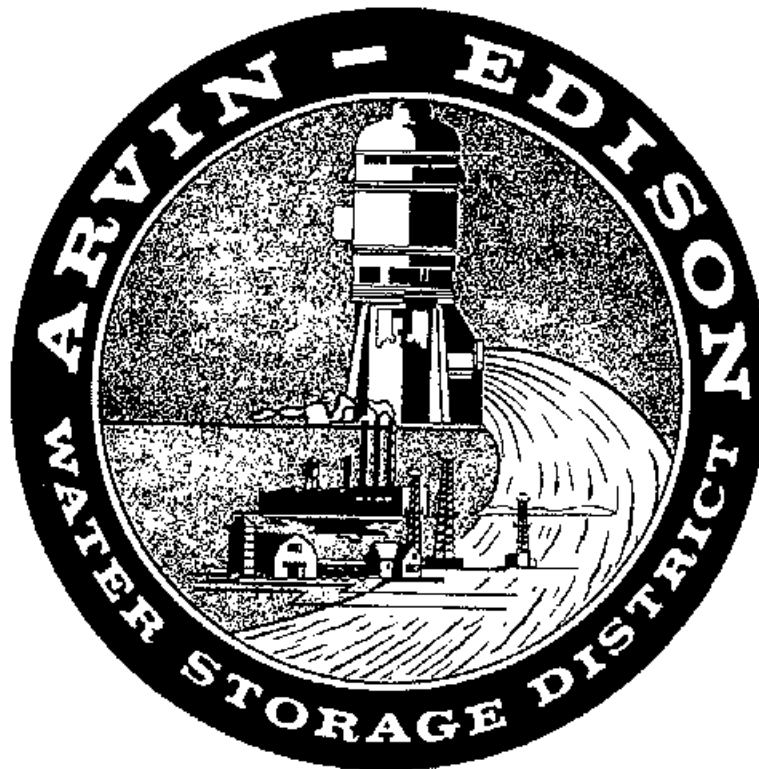
Delano-Lewkalb-Driver: Deep, nearly level to moderately sloping, well drained sandy loam and coarse sandy loam

Premier: Deep, undulating to hilly, well drained coarse sandy loam

ATTACHMENT

C

Rules and Regulations for Distribution of Water



Arvin, California

RULES AND REGULATIONS
FOR DISTRIBUTION OF WATER
ARVIN-EDISON WATER STORAGE DISTRICT

AS ORIGINALLY ADOPTED BY RESOLUTION NO. 68-16, January 2, 1968
AS AMENDED AND RESTATED BY RESOLUTION NO. 06-03, January 10, 2006

20401 Bear Mountain Boulevard

Mailing Address: P.O. Box 175
Arvin, California 93203-0175

Telephone Numbers:

District Office..... (661) 854-5573
District Fax (661) 854-5213
District Email arvined@aewsd.org
Watermaster/Dispatcher..... (661) 854-4433
Forrest Frick Pumping Plant..... (661) 366-7721
Tejon Pumping Plant..... (661) 854-2378
North Canal Spreading Works..... (661) 854-5579
Intertie Pump Plant..... (661) 858-2348
CIMIS (661) 634-3404

ARVIN-EDISON WATER STORAGE DISTRICT

OFFICERS AND DIRECTORS

Director, Division 1.....Ronald R. Lehr
Director, Division 2..... Vice-President, Salvatore Giumarra
Director, Division 3..... President, Howard R. Frick
Director, Division 4..... Donald M. Johnston
Director, Division 5..... Secretary-Treasurer, John C. Moore
Director, Division 6..... Edwin A. Camp
Director, Division 7..... Charles Fanucchi
Director, Division 8..... George W. Fry
Director, Division 9..... Donald J. Valpredo

STAFF

Engineer-Manager..... Steven C. Collup
Assistant Manager.....David A. Nixon
Staff Engineer..... Steven H. Lewis
General Superintendent.....Christopher P. Krauter
Watermaster Perry L. Hyatt

TABLE OF CONTENTS

DIVISION I: GENERAL

Section	Page
1. Purpose.....	1
2. Definitions	1
3. Interpretation-Federal Contracts/Reclamation Law	1
4. Enforcement of Rules and Regulations	1
5. Effective Date and Changes	2
6. Severability of Provisions-Captions.....	2

DIVISION II: GENERAL PROJECT ADMINISTRATION

Section	
1. Engineer-Manager and District Employees.....	2
a. Engineer-Manager.....	2
b. District Employees.....	2
c. Appeal of Decision of Engineer-Manager	2
d. Right of Access	2
2. Equipment and Records.....	3
a. Equipment.....	3
b. Records.....	3
3. Ownership, Notices, Representatives, and Appointment of Agents	3
a. Land Ownership-Address of Landowners.....	3
b. Representatives	3
c. Appointment of General Agent	3
d. Eligibility Under Reclamation Law	4
4. Transfers of Land-Assumptions and Encumbrances.....	4
a. Transfer of Title to Land	4
(1) District Records.	4
(2) Transfers Affecting Water Service Contract Assumption Agreements.....	4
b. Warranty of Title	5
c. Request for Notice.....	5
5. Segregation of Lien for Delinquent Tolls or Charges - Partial Redemption	5
6. Liability of District	6
7. Actions Against District	6
8. Liability of Water User	7
9. Groundwater Storage and Preservation of Pumping Rights.....	7
10. Encroachment of District Rights of Way.....	8
11. Modification of the System	8

DIVISION III: DISTRIBUTION OF WATER

Section	Page
1. Surface Water Service Area.....	9
a. Additions of Lands to Surface Water Service Area.....	9
b. Exclusion of Lands from Surface Water Service Area.....	9
2. Water Service.....	9
a. Water User.....	10
b. Operating Agent.....	10
(1) Appointment.....	10
(2) Term of Agency-Revocation.....	10
c. Payment for Water Service.....	10
d. Determination of Charges.....	12
e. Tiered Water Pricing.....	12
f. Delinquencies.....	12
g. Carry Over Prohibited.....	13
3. Temporary Water Service for Special Purposes.....	13
4. Temporary Water Service for Agricultural Uses.....	13

DIVISION IV: ORDERING, DELIVERY, AND USE OF WATER

Section	
1. Annual Application(s) for Contract Water Service.....	14
2. Revised Annual Application(s) for Contract Water Service.....	14
3. Continuous Delivery.....	14
4. Water Service Orders.....	15
5. Delivery Change Within the Same Lateral.....	15
6. Emergency Turn Offs.....	15
7. Unauthorized Adjustments of Flow.....	15
8. Interruptions in Service.....	16
9. Proration of Water Delivery.....	16
a. System Deficiency.....	16
b. Water Shortage.....	16
10. Use of Other Water Supplies.....	16
11. Waste of Water.....	16
12. Farm Turnouts-Connections.....	16
13. Combined Turnouts.....	17
a. Combined Turnout Agreement and Consent to Easement.....	17
b. Rate of Delivery.....	17
14. Delivery of Municipal, Industrial, and Domestic Water.....	17
15. Condition of Water.....	17
16. Section 592 of the Penal Code of the State of California.....	17

DIVISION V: POLICIES AND PROCEDURES FOR ESTABLISHING, FIXING AND COLLECTION OF CHARGES AUTHORIZED BY SECTIONS 43006 AND 47180 OF THE WATER CODE FOR GENERAL ADMINISTRATION AND GENERAL PROJECT SERVICES RENDERED BY THE ARVIN-EDISON WATER STORAGE DISTRICT

Section	Page
1. Policies.....	18
a. General Administrative Service Charge	18
b. General Project Service Charge	18
2. Procedures.....	19

ARVIN-EDISON WATER STORAGE DISTRICT

RULES AND REGULATIONS FOR DISTRIBUTION OF WATER

EFFECTIVE MARCH 1, 2006

DIVISION I: GENERAL

1. **Purpose:** These Rules and Regulations are established by the Board of Directors of the Arvin-Edison Water Storage District pursuant to the requirements of Division 14 of the California Water Code, specifically section 43003 of said Water Code, and, in furtherance of District's Adopted Project, in order to provide for the most economical and efficient distribution and use of water within the District and establish procedures for fixing tolls and charges authorized by sections 43006 and 47180 et seq., of the California Water Code. These Rules and Regulations are the Rules and Regulations mentioned in the Water Service Contracts between the District and various landowners within District's Surface Water Service Area.
2. **Definitions:** Terms and expressions employed in these Rules and Regulations are as defined in the Water Service Contracts executed by the District and its landowners with the exception of certain terms or expressions used herein which do not appear in said Contracts, but which terms or expressions are defined or explained at the point where they are introduced into these Rules and Regulations or which are defined or explained in the Reclamation Reform Act of 1982, Pub. L. 97-293 (96 Stat. 1263) and the Rules and Regulations for Projects governed by Federal Reclamation Law (43 CFR Part 426).
3. **Interpretation-Federal Contracts/Reclamation Law:** These Rules and Regulations are in implementation of the contract effective March 1, 2001, between Arvin-Edison Water Storage District and the United States of America regarding water delivery, and any other contracts which may be entered into between Arvin-Edison Water Storage District and Water Users for water service; any amendment to the foregoing; and the Reclamation Reform Act of 1982, Pub. L. 97-293 (96 Stat. 1263) and the Rules and Regulations for projects governed by Federal Reclamation Law (43 CFR Part 426).
4. **Enforcement of Rules and Regulations:** The Engineer-Manager of the District is authorized to perform all acts necessary and proper to enforce these Rules and Regulations. **Failure of a Water User to comply with any of the Rules and Regulations shall be sufficient cause for the termination of water service, and water service will not again be furnished to such Water User until full compliance has been made with all requirements as herein set forth;** PROVIDED, HOWEVER, that Water User shall in no way be relieved of any responsibility for payment of any charges or obligations by reason of such termination of water service. When it is practicable to do so, advance notice of any such termination of water service will be furnished to Water User. In no event shall any liability accrue against District or any of its officers, agents, or employees for damage, direct or indirect, arising from such terminations of water service. Non-enforcement of any provision of these Rules and Regulations does not constitute a waiver of the District's right of enforcement at any time.

5. Effective Date and Changes: These Rules and Regulations, as amended, shall become effective January 10, 2006, and may be added to, amended, or repealed at any time by resolution of the Board of Directors of the District and such additions, amendments, or repeals shall become effective upon adoption or as otherwise specified by the Board of Directors.

6. Severability of Provisions - Captions: If any provisions of these Rules and Regulations, or the application thereof to any person or circumstances are held invalid, the remainder of these Rules and Regulations and the application of their provisions to other persons or circumstances shall not be affected thereby.

Captions accompanying these Rules and Regulations are for convenience or reference and do not form a part thereof.

DIVISION II: GENERAL PROJECT ADMINISTRATION

1. Engineer-Manager and District Employees:

a. Engineer-Manager: The Engineer-Manager is the person appointed by the Board of Directors to manage, pursuant to the Board's direction, the affairs of the District. The District's distribution system is under the exclusive management and control of the Engineer-Manager. Except as provided in Division IV, Section 6 hereof (relating to emergency turn-offs), no person other than the Engineer-Manager or District employees designated by him shall turn on, turn off, or otherwise adjust, manipulate, or use any of the District's facilities; provided, however, the Engineer-Manager may provide written authority for water users to turn on, turn off or otherwise adjust facilities under specified conditions, which authority may be withdrawn at any time.

b. District Employees: The Engineer-Manager shall supervise the activities of all District employees in connection with the operation and maintenance of the Distribution System and all other activities of the District. The Engineer-Manager shall designate the authority of each of the employees of the District. Any controversy between a Water User and a District employee that cannot be settled directly shall be appealed to the Engineer-Manager.

c. Appeal of Decision of Engineer-Manager: In event the Water User disagrees with a decision made by the Engineer-Manager in administering these Rules and Regulations, said Water User shall have the right to appeal to the Board of Directors within ten (10) days after notice of such decision. Appeals shall be submitted in writing to the Board and shall specifically set forth the decision being appealed and shall give reasons for said appeal. Appeals shall be considered at the next regularly scheduled meeting of the Board.

d. Right of Access: Persons employed by the District and/or authorized by the Engineer-Manager shall have access at all times to all lands and District, water distribution facilities within the District for the purpose of conducting District business. Except in cases of emergency or where otherwise considered impractical by the Engineer-Manager, the person in possession of the land shall first be contacted before entering landowner's property. Nothing herein contained shall affect any District easement or right-of-way.

2. Equipment and Records:

a. Equipment: No property of the District, including tools, machinery, equipment, vehicles, and the like shall be used for purposes other than District business. No property of the District, including tools, machinery, equipment, vehicles, and the like shall be borrowed or loaned for any purpose without the expressed authorization of the Engineer-Manager.

b. Records: All records of the District shall be maintained at the District office. Such records are for the exclusive use of the District and shall be made available for use for other purposes only as provided in the provisions of Chapter 3.5, Division 7, Title 1 (commencing with Section 6250, of the California Government Code and certification forms submitted to the District pursuant to Federal Reclamation Law are protected from disclosure to the extent provided by the Privacy Act of 1974, 5 U.S.C. §552.)

3. Ownership, Notices, Representatives, and Appointment of Agents: For administration of these Rules and Regulations and District's Water Service Contracts, it is necessary that certain matters (including, but not limited to, matters regarding applications for water service; ordering, delivery, and use of water; and giving notice to Water Users) shall be authorized in writing by the Water User. For convenience of Water Users and District and without releasing a Water User's land from any obligations under their Water Service Contract or these Rules and Regulations, District will provide water service pursuant to the following determinations and authorizations:

a. Land Ownership - Address of Landowners: In all respects where materially relevant to administration of these Rules and Regulations, except as provided in Division II, Section 4a(1) hereof (relating to transfer of title and District records), owner of land means the person(s) or entity shown on the Kern County Assessment Roll, last equalized, at the time in question and as determined in accordance with the Water Code, sections 39051 through 39054, inclusive. Addresses of landowners will be determined in a like manner.

Except as provided in Division II, Section 4a(1), if title to land has been transferred and the change of interest does not appear on said Assessment Roll, it is the duty of the Transferee to present proper proof of title to the District.

b. Representatives: Anyone acting in any representative capacity for a Water User shall furnish evidence to the satisfaction of the District of his/her authority to so act and bind the lands of Water User. Such representatives include guardians; conservators; administrators; executors; trustees; partnerships, including limited partnerships; attorneys-in-fact; and the like.

c. Appointment of General Agent: Where Water User consists of more than one owner (undivided ownership), except a husband and wife living at the same address, or when Water User is an entity (e.g., corporation, public agency, etc.) Water User shall, by written instrument, file with the District and appoint a general agent for the purpose of performing any and all acts to be done by Water User (except permanent assignment of rights) and for receiving all notices, billings, and refunds from District for charges incurred by reason thereof. In case of husband and wife living at the same address, in absence of written notification to the contrary it is to be presumed that either has such authority to act for the other. Appointment of such agent shall be made on forms furnished by District and

executed and filed in a manner satisfactory to District. Forms will stay in force until revoked or superseded. Failure to appoint such an agent may result in discontinuance of water service delivery until an agent has been appointed.

d. Eligibility Under Reclamation Law: As set forth in Article 8 of District's Water Service Contracts, it is a continuing obligation of the Water Users to do all things necessary and proper to comply with applicable provisions of Reclamation Law, as amended, and with District's contracts with the United States for water service. As further provided in said Article 8, failure to comply with such requirements does not excuse the Water User from the requirement that the contract charges be timely paid.

In this connection, portions of the Rules and Regulations for Projects Governed by Federal Reclamation Law, adopted by the Secretary of Interior, are of particular importance. The Regulations establish that all landowners and lessees, except those with 240 acres or less west wide, are required to certify as to their landholdings on an annual basis as a condition of receiving water service from this District. Other provisions of the Federal Regulations declare leased lands will be ineligible for water service from the District unless the leases are in writing and for terms of no more than 10 years except land used for perennial crops, where the maximum term is 25 years.

In addition to the foregoing concerning eligibility of lands to receive water, Water Users should be aware that the size of their landholding including all lands owned or leased (including lands owned or leased through entities in which they have an interest) receiving water from federal projects in the Western United States, may have an impact on the availability of water from such projects and the price which they must pay for water delivered by this District and other districts. All Water Users are cautioned to consider such matters and seek qualified advice, as needed. Furthermore, any Water User or person leasing Water User's lands, which receive water service without first filing completed "certification" forms mentioned above may, as pronounced by the Bureau of Reclamation, be subject to penalties, which sum the District shall add to that due by the Water User.

4. Transfers of Land - Assumptions and Encumbrances:

a. Transfer of Title to Land:

(1) District Records: Notwithstanding any transfer or change of ownership, District shall be entitled to administer these Rules and Regulations and Water Service Contracts in reliance upon and in accordance with matters on file at the District office only (regardless of the knowledge of any agent, servant, or employee to the District acquired in any other manner) including such matters as determining landownership, addresses, authorizations, appointments, designations, refunds, and the like. Such matters are continuing representations upon which the District is entitled to rely unless and until the District has received actual written notice of a change or revocation.

(2) Transfers Affecting Water Service Contract Assumption Agreements: Without limiting the provisions of Article 7 of the Water Service Contracts, when title to land affected by a Water Service Contract is transferred or such lands are the subject of a contract of sale, District will be under no obligation to deliver water to such lands until the Water Service Contract is assumed by the new landowner or provisions made for service to

the Buyer, as the case may be; provided, however, service will continue to be made to any Operating Agent that has been previously appointed as provided in Division III, Section 2b hereof, until said appointment is otherwise revoked. Such Assumption Agreements shall be on forms provided by the District, executed and completed in a manner satisfactory to the District. In the event of such transfer of ownership as to a portion of the lands described in an Exhibit "A" to a Water Service Contract, and in the absence of written instructions from the affected landowners, agreements will be prepared so as to allocate the rights and obligations under said Water Service Contract on an acreage basis. (See Division IV, Section 13 hereof for Combined Turnouts). The District may decline to approve such Assumption Agreement and discontinue water service if such conveyance of a portion of the lands described in Exhibit "A" results in a parcel in separate ownership of less than five (5) acres.

b. Warranty of Title: The execution by the District of any Assumption Agreement shall be without any warranty of title on the part of the District and shall not be interpreted as any representation, expressed or implied, by or on behalf of District, that such assignment, transfer, or disposal is free and clear of outstanding encumbrances.

c. Request for Notice: Without attempting to establish or in any manner affect the rights of any person arising from a deed of trust, any person or entity having any interest in a deed of trust on property subject to an Water Service Contract may file with the District a written request for notice of failure to make the payments required by such Water Service Contract or a request for notice of any specified act that the District may be requested to undertake or to consent to under the Water Service Contract or these Rules and Regulations that such person alleges will detrimentally affect his/her interest, including, but not limited to, a request for exclusion from the Surface Water Service Area, a request for assignment of rights under Water Service Contract, or a request for permission to utilize water on lands other than those described in Exhibit "A" to an Water Service Contract.

Upon receipt of such notice, District shall give such person or entity written notice of default or of any request that it take such action as is set forth in the request for notice at least 15 days prior to foreclosure proceedings or prior to such other specified act by the District, unless such person or entity has given written consent to the requested action. In addition to setting forth the matter as to which notice by the District is requested, the request for notice shall set forth a legal description of the land affected, the name of the current owner of the fee, the name and address where the requested notice is to be sent, and a copy of the deed of trust showing the recording information.

Any notice from the District shall be effective when deposited in the mail, postage prepaid, directed to the address shown in the notice. Provided, however, District may disregard any request for notice which has not been re-filed within 15 days of a written demand, therefore, by the District mailed in the same manner and with the same effect as hereinabove provided for the notice by the District. Provided further, however, nothing herein provided shall render District liable to any person or entity under any circumstances.

5. Segregation of Lien for Delinquent Toll or Charge - Partial Redemption:

a. For purposes of payment of delinquent tolls and charges, including Water Service Contract charges, the owner(s) (excluding owners of undivided interests) of any separately described portion of a tract of land subject to a lien established pursuant to

Section 47183 of the Water Code, other than the owner(s) named in the delinquent list recorded pursuant to Section 47183 of the Water Code, may, with the consent of all the owners of said tract of land, request the Board to direct the District Treasurer, or the County Tax Collector, as the case may be, to segregate said lien ratably in accordance with the acreage of the respective tracts; to accept payment of said segregated amounts in satisfaction of said respective segregated liens; and, upon receipt of payment, to issue a recordable satisfaction of such lien or to delete said parcel from the notice of sale provided for in Section 46730 et seq., of the Water Code, or to cancel the sale as to said parcel, as the case may be.

If the Board finds that the respective tracts are adequate security for the segregated amounts and that such segregation is not detrimental to the best interest of the District, it shall enter such order which shall become effective upon payment of the sum due.

b. For like purposes, any Transferee (excluding undivided owners) of any separately described portion of a tract of land for which the District holds a certificate of sale issued pursuant to Section 46759.5 et seq., of the Water Code, other than the owner named in the delinquent list recorded pursuant to Section 47183 of the Water Code by reason of which said certificate or deed was issued, may, with the consent of all of the owners of said tract of land, request the Board to direct the County Tax Collector to segregate the amount for which the property was sold to District ratably in accordance with the acreage of the respective tracts, to compute the amount required for redemption pursuant to Section 46786 of the Water Code on the basis of said segregated sale price, to accept such sum found to be due, and to issue a certificate of partial redemption describing the portion redeemed. If the Board finds that the respective tracts are adequate security for the segregated amounts and that such segregation is not detrimental to the best interests of the District, it shall enter such order which shall become effective upon payment of the sum due.

6. Liability of District: As provided in Article 2 Section (g) of the Water Service Contracts and in connection with all water service provided pursuant to these Rules and Regulations, District will not be responsible for the control, carriage, handling, use, disposal, or distribution of water delivered to Water Users or Contractors hereunder outside the facilities then being operated and maintained by District.

As provided in Article 2 Section (j) of the Water Service Contract, and in connection with all water service provided pursuant to these Rules and Regulations, in no event shall any liability accrue against District or any of its officers, agents, or employees for any damage, direct or indirect, arising from temporary discontinuance or reduction of water deliveries.

As further provided in Article 2 Section (k) of the Water Service Contract, and in connection with all water service provided pursuant to these Rules and Regulations, in no event shall, any liability accrue against the District or any of its officers, agents, or employees, for any damage, direct or indirect, arising from a shortage on account of problems in deliveries, drought, or any other cause whatsoever.

7. Actions Against District: Nothing contained in these Rules and Regulations constitute any waiver by District or estop it from asserting any defenses or immunities from liability as provided in Division 3.6 of Title 1 of the Government Code. In connection with any such matters, one may wish to seek the advice of an attorney of their choice.

8. Liability of Water User: As provided in Article 2 Section (d & g) of the Water Service Contract and by acceptance of surface water service provided pursuant to these Rules and Regulations, Water User and/or Contractor does hereby agree to indemnify and to assume the defense of and hold harmless the District and its officers, agents, and employees from any loss, damage, liability, claims, or causes of action of every nature whatsoever, for damage to or destruction of property, including the District's property, or for injury to or death of persons, in any manner arising out of or incidental to the control, carriage, handling, use, disposal, or distribution of water outside District's Distribution System. No persons will be allowed to drain irrigation water or tail water upon or permit water to drain upon District-owned property except as authorized in writing by the District Engineer-Manager and any person doing so will be subject to fine and damages; will be in violation of these Rules and Regulations; and water service may be terminated until such violation ceases.

It is the duty of the Water User to furnish sufficient protection for the individual farm turnout or any other District facility to prevent damage. In the event that damage occurs, the expense of District personnel and/or contractors for the repair of such damage will be borne by Water User and no water will be furnished through the affected turnout until such repairs are made and the charges therefore are paid to the District.

Pursuant to the provisions of Article 2 of District's Water Service Contracts, dealing with conditions of delivery, place of use of Project Water, Water User's liability and indemnification; water delivery may be discontinued by the District for any Water User who permits water delivered by District to escape beyond the boundary of the lands described in said contract whether willfully, carelessly, or on account of defective or inadequate ditches or pipelines, or inadequate tail water facilities, or inadequately prepared land or improper management, and said water delivery will not be resumed until such conditions are corrected.

9. Groundwater Storage and Preservation of Pumping Rights: In order that no Water User be prejudiced by utilizing Project Water in lieu of exercising whatever rights he or she may have to pump groundwater, and in recognition of the anticipated benefit to the District's underground water supply arising from the implementation of the District's project, the Board of Directors has adopted the following policies:

a. All Water Service Contracts with the District for water service include a paragraph (Article 2[e]) which is quoted following:

"In the interest of preserving to Landowner¹ its rights to pump groundwater for use on his/her lands, which will be served with water under this Contract, it is agreed that, during all years that District delivers water to Landowner, to the extent that Landowner shall reduce their pumping of groundwater and shall make use of water so delivered to it by District, Landowner's said use of water so delivered to him/her by the District shall be deemed the same as if he/she had pumped from the underground a quantity of water equal to the quantity of water so delivered to him/her by District. Landowner also agrees to recognize and be bound by the pumping rights similarly preserved to other Landowner in

¹ In municipal and industrial contracts, Landowners are sometimes called "Contractors."

the District pursuant to water service contracts heretofore and hereafter executed. It is further agreed that, as a result of District's spreading of water and percolation thereof to underground storage, either by direct recharge ponds or through deliveries in lieu of Landowners pumping groundwater, District shall have the exclusive right to use of the underground storage for (i) spreading and recovery of water in connection with supplying water Landowner and to all other Landowners who shall heretofore or hereafter execute contracts with District for water service; (ii) providing stored water to third parties which have contracted with the District or (iii) for any other lawful purpose."

b. That, to the extent District may pump water from underground supplies for furnishing to Water Users, District shall be deemed to be exercising said Water Users' rights to pump water from underground water supplies; PROVIDED, HOWEVER, that nothing herein contained shall prevent or hinder any Water User from exercising their rights to pump groundwater.

c. It is declared that without obligating District to assume any responsibility therefore and without limiting or detracting from the obligations assumed by Water Users in this regard, District shall have the right to the use of all seepage and return flow resulting from Project Water which escapes, percolates, or is discharged beyond Water User's recovery facilities, if any, and nothing contained in said Water Service Contract or contained herein shall be construed as an abandonment or relinquishment by District of the right to the recapture, use, and benefit of all such water and any use made of any resultant benefit to groundwater conditions is made with its consent, which consent is revocable at any time, and such use is not to be considered a use adverse to such right to the continued exercise of right to pump and utilize groundwater, nor shall any such use under any circumstances create an estoppel in asserting any such right at any time.

10. Encroachment on District Right-of-Way: Without limiting rights otherwise reserved, a permit for encroachment shall be required before any fences, pipelines, or other encroachments will be permitted upon District's property. An encroachment permit form approved by the Board of Directors will be furnished by District and must first be approved by the Engineer-Manager before any construction begins. The work shall be constructed to the District's specifications at the sole expense of the applicant and maintained under supervision of, and to the satisfaction of, the District. Under no circumstance shall any facilities be constructed or permanent crops be planted which prevent access to District facilities for repair of such facilities.

11. Modification of the System: If a modification to District's Distribution System is made at the request of a Water User, and for his/her benefit, including, but not limited to, construction of a turnout, the costs thereof, including reasonable charges for engineering performed by District and overhead, shall be paid in advance by such Water User. The advance payment shall be determined by the estimate of the Engineer-Manager. Within 30 days after submittal of final accounting, Water User shall pay or District will refund the difference between said estimated costs and the actual costs of the modification. All modifications to the Distribution System shall be made in accordance with District specifications and subject to District's approval. The construction of such facilities shall be done by or at the direction of District and shall become the property of District.

DIVISION III: DISTRIBUTION OF WATER

1. Surface Water Service Area: Surface Water Service Area means that certain area of land within the District to which surface water service is available pursuant to an Water Service Contract with the District, said area having been selected pursuant to criteria adopted by the Board. Said area of land consists of all those parcels of real property described in Exhibit "A" to said Water Service Contracts. Lands within the Surface Water Service Area are shown on a map on file at the District office designated as "Surface Water Service Area" as amended from time to time. In the case of a conflict between the lands described in Exhibit "A" to said Water Service Contracts and said map, the description contained in said Exhibits shall govern. The originals of said contracts are on file at the District office and recorded in the Official Records of Kern County. Said contracts are uniform in nature differing only as to whether the service to be provided is for agricultural or municipal, industrial and domestic purposes.

a. Addition of Lands to Surface Water Service Area: Lands may be added to the Surface Water Service Area only if the following conditions are met:

(1) An application for addition to the Surface Water Service Area is filed with the Board by the owner or owners of the lands described in said application;

(2) The Board determines that water service is available for said lands and such addition is feasible and in the best interest of, or not detrimental to, District and its landowners;

(3) The owner or owners of said lands execute a Water Service Contract with the District in the form established by the Board including such special conditions as it may reasonably require, and pay such charges as the Board finds equitable and just.

b. Exclusion of Lands from Surface Water Service Area: Lands may be excluded from the Surface Water Service Area only if the following conditions are met:

(1) An application for exclusion is filed with the Board by the owner or owners of the lands described in said application. Such application shall state that the applicant understands that if exclusion is granted, he/she must waive any right the lands may have had to surface water service under existing policies.

(2) The Board determines that water service for said lands has been requested by other lands in the District, subject to such conditions of service as the Board may reasonably require, and that the exclusion is feasible and in the best interest of, or not detrimental to, the District and its landowners.

(3) All documents necessary to effect the transfer have been properly executed and that payment of such charges as the Board finds equitable and just has been made or provided for.

2. Water Service: Contract Water Service is water service available only to lands within District's Surface Water Service Area pursuant to District's form of Water Service Contract and only to lands described at Exhibit "A" of said contract; provided, however, a Water User may deliver water from a particular turnout to other lands in the Surface Water

Service Area which are designated in the annual application filed pursuant to Division IV, Section 1 as part of Water Users Farming Unit Operations. A Farming Unit Operation shall consist of lands owned, leased or managed, or a combination thereof, by a common Water User, for which the Water User is otherwise authorized to act pursuant to these Rules and Regulations.

a. **Water User** means the owner of land described in Exhibit "A" of a fully executed Water Service Contract or their representative or agent as appointed pursuant to Division II, Section 3c (relating to General Agents) or Division III, Section 2b (relates to Operating Agents) hereof.

b. **Operating Agent:**

(1) **Appointment:** Water User may by written instrument filed with the District, appoint an Operating Agent, and authorize said Agent to apply for such water service as is or may be available for the turnout(s) designated in the appointment, order such water, and Water User may designate the Operating Agent as the person to receive the billings, notices, and refunds due in connection with service to such turnout(s). Such authorization must be made on forms provided by the District, and executed and completed in a manner satisfactory to the District. The authorization shall remain in effect, and District may rely thereon until the same is revoked as provided for below or superseded by subsequent filing of a like document.

(2) **Term of Agency - Revocation:** The appointment of such agent shall be binding upon and shall inure to the benefit of Water User, their respective heirs, executors, administrators, successors and assigns, and each and every one of them, or any person or entity claiming any interest in the lands affected by said Water Service Contract by, through, or under any Water User and to the District and its successors and assigns. The power and authority of such agent shall continue until Water User or, in the case of undivided ownership, a majority of Water Users (determined on an acreage basis), shall have filed with District a written revocation of said agency executed in the same form as the appointment, or a superseding appointment is filed with the District. Said agency is revoked by death of the agent, or his/her incapacity to act, or by his/her renunciation by written notice of resignation filed with the District.

c. **Payment for Water Service:** Under conditions of Contract Water Service, Water User shall pay the "Standby" Charge and the "Water Use" Charge as provided in the Water Service Contract. These charges shall be annually fixed by the Board and shall be due by and delinquent as shown on the following schedule:

Standby Charge and Water Use Charge Payment Schedule

Payments	Month	Billed	Due	Delinquent
1	March	04/05	04/10	05/10
2	April	05/05	05/10	06/10
3	May	06/05	06/10	07/10
4	June	07/05	07/10	08/10
5	July	08/05	08/10	09/10
6	August	09/05	09/10	10/10
7	September	10/05	10/10	11/10
8	October	11/05	11/10	12/10
9	November	12/05	12/10	01/10
10	December	01/05	01/10	02/10
11	January	02/05	02/10	03/10
12	February	03/05	03/10	04/10

Note: The Standby Charge may be prorated over the first nine (9) payments; or provided the Board may annually determine that it be paid with the 12th payment and the "Standby" Charge be waived to the extent Water User has paid "Water Use" Charges totaling for the Water Year an amount at least equal to the "Standby" Charge.

***Penalty of ten percent (10%) and interest of twelve percent (12%) per annum will be assessed.**

A statement indicating the balance of Water User's account for both the Standby Charge and the Water Use Charges will be mailed approximately the fifth day of each month and shall be due and payable by the tenth day of the month, and delinquent one month thereafter. A penalty of ten percent (10%) and interest at the rate of one percent (1%) per month will be assessed on the delinquent date.

The **Standby Charge** may be paid in full at the beginning of the water year or paid in nine (9) installments as defined above in the Standby Charge payment schedule; provided the Board may annually determine that it be paid with the 12th payment, and the Standby Charge be waived to the extent Water User has paid Water Use Charges totaling for the Water Year an amount at least equal to the Standby Charge. The Standby Charge provided in the Water Service Contract is a per acre charge and is due the District regardless of the quantity of water used under a Water Service Contract. Water User will be notified prior to the beginning of a Water Year as to the amount of the Standby Charge as provided in the Water Service Contract.

The **Water Use Charge(s)** as provided in the Water Service Contract shall be billed based on the quantity of water used the previous month. The amount of the Water Use Charge shall consist of a **water component** plus an **energy component** for the District's energy cost for each pump lift, including Forest Frick Pumping Plant and groundwater pumping, there being one to six pumping lifts as identified in Exhibit "A" of each Water User's contract by turnout. Water User will be notified prior to the beginning of a Water Year as to the amount of the Water Use Charge as provided in the Water Service Contract.

d. **Determination of Charges:** The amount of the per acre **Standby Charge** and the amount of the per acre-foot **Water Use Charge** shall be fixed each year by the Board of Directors and determined as follows:

The sum of the **Water Use Charge** and to the extent applicable the **Standby Charge** shall approximate the average total per acre-foot cost of producing groundwater within the District (including capital recovery, operations, maintenance, repair, standby power, and energy costs).

The per acre-foot **Water Use Charge** further consists of a **Water Component** and an **Energy Component**. The **Energy Component** is a variable charge and shall approximate the average energy cost to the District of each additional pump plant lift required for the delivery of water including Forrest Frick Pump Plant and Groundwater Pumping. The Water Component shall provide for all or a portion of the cost of the water.

Additional sums may be added to the per acre-foot **Water Use Charges** as required the United States pursuant to the Reclamation Reform Act of 1982 ("RRA") and the Federal Rules and Regulations for projects Governed by Federal Reclamation Law, including "full cost" charges.

e. **Tiered Water Pricing:** Tiered water pricing charges will be determined and fixed by the Board and may be imposed in addition to the Water Use Charge in any year the Board determines that in order to meet the demands of the Water Users in the Surface Water Service Area the District will be pumping significant quantities of water from its well fields or in lieu thereof will be purchasing additional quantities of water from sources other than its contract with the United States. During such a year, notice of the applicability of tiered water pricing will be mailed to each water user, which notice may not be given until after March 1 because of uncertain water supplies.

f. **Delinquencies:**

(1) No water order or application for water for any person or entity who is delinquent in payment of District charges, District assessments, or any additional sums as may be required pursuant to the Reclamation Reform Act of 1982 or the Federal Rules and Regulations for Projects Governed by Federal Reclamation Law adopted pursuant thereto will be honored until such delinquent charges, or assessments, or sums are paid in full.

(2) If the installment or payment is not received in the **District office** by 5:00 p.m. on the date in which it becomes delinquent (or when the delinquent date falls on a weekend or District-observed holiday, by 5:00 p.m., the next regularly scheduled workday) as defined in Division III, Section 2c, hereof, delivery of water service shall be discontinued without notice and no further water service deliveries will be made until all delinquencies, including penalties, and interest, have been paid.

(3) Thirty days after each installment or payment becomes due it shall become delinquent and a penalty of ten percent (10%) of the amount of the installment or payment will be assessed. In addition, said delinquent installment or payment shall be subject to interest at the rate of twelve percent (12%) per annum from the date of the delinquency until all installment or payments are current as defined in Division III, Section 2c.

(4) In the event a Water User is delinquent on any Standby or Water Use Charges as of April 10 of each calendar year, for the prior Water Year, action will be commenced by the District to collect all charges due in accordance with the provisions of the Water Service Contract and Sections 47181 to 47185, inclusive, of the Water Code. Provided, however, the District may initiate such action prior to such date as to any delinquency.

(5) A trustee or beneficiary under deed of trust that has recorded a notice of default of land that is delinquent in payment of water service tolls and charges may deposit the amount of such tolls and charges with the District as are necessary to keep the lands current.

g. Carry Over Prohibited: Water made available in a particular year may not be carried over for use in the following Water Year, regardless of the reason why the water was not used or available for use during that Water Year.

3. Temporary Water Service for Special Purposes: Temporary Water Service for Special Purposes is water service made available on an interruptible and non-dependable basis for uses not directed to agricultural uses, within or outside of the Surface Water Service Area. Such water may be made available at the discretion of the Engineer/Manager on a short-term basis only, and District reserves the right to discontinue such service at any time. Persons wishing such service must either make arrangements with a Water User for use of turnout facilities or with District if water is to be taken directly from District's canal or other facility; file with District a form of contract entitled "Arvin-Edison Water Storage District Contract for Temporary Water Service for Special Purposes"; and make such payments or deposit such funds as are set forth in said form of contract pursuant to policy established by the Board from time to time.

4. Temporary Water Service For Agricultural Uses: Temporary Water Service for Agricultural Uses is water service made available for agricultural use on an interruptible and non-dependable basis to lands outside the Surface Water Service Area. In the event that the Board determines that temporary water service for a given period or water year is in the best interest of the District, the Board may authorize such service and set charges. Such temporary water service shall be made available only to lands having an independent alternative source of water and no crop is to be planted which will be dependent upon the continued delivery of the temporary water. In order that land located outside the Surface Water Service Area is to be eligible for temporary water service, the landowner shall have executed an agreement establishing a covenant running with the land, in a form provided by the District, wherein the landowner expressly acknowledged that the affected lands have no right to Contract Water Service from the District. All charges resulting from the sale of such temporary water service must be paid to the District in advance and prior to commencement of delivery. Such temporary water service may be made available to eligible land through an existing farm turnout or through a temporary farm turnout to be installed by the District at landowner's expense and used to serve temporary water or directly from District's Distribution Facilities canals through pumps and metering devices installed to District's specifications and at landowner's expense, which facilities shall be operated solely by District personnel; provided that District facilities are able to deliver the extra water and the delivery of such water does not interfere with water service deliveries to Water Users within the Surface Water Service Area. It is the responsibility of the party requesting such

temporary water service, if a facility to deliver water to his/her lands is not in place, to make arrangements with a Water User for the use of an existing farm turnout or to pay, in advance, the cost of installing a connection from a District facility to the desired point of delivery. The District is under no obligation to continue such temporary water service and delivery of temporary water may be terminated by District at any time. In the event of such termination, the Temporary Water User will be refunded any unused portion of the charges paid to the District by him/her. An annual agreement setting forth the conditions contained herein must be entered into by and between District and Temporary Water User prior to commencement of the delivery of such temporary water service. Such agreement shall be in a form furnished by the District, and executed and filed in a manner satisfactory to District.

DIVISION IV: ORDERING, DELIVERY, AND USE OF WATER

1. Annual Application(s) for Contract Water Service: In order to obtain delivery of Contract Water Service each year, Water User must complete, sign, and file with the District no later than February 1 of each year, an "Annual Application for Contract Water Service" covering lands described in Exhibit "A" of the Water Service Contract and designating any Farming Unit Operation for the following year, and such additional documents as may be required to comply with the eligibility requirements of the Reclamation Reform Act of 1982 and the Federal Rules and Regulations for Projects Governed by Federal Reclamation Law enacted pursuant thereto. **Water service will not be made available to any such land until each and all documents necessary to meet eligibility requirements are filed.** As provided in Section 3(b) of the Water Service Contract and Division IV, Section 9 of these Rules, District will schedule water deliveries and deliver water to Water Users as nearly in accordance with their requests as is practicable and District's determinations with regard to scheduling of water deliveries shall be conclusive.

The application will be sent to Water Users no later than December 15th of the preceding year. Water User shall include the following information:

- a. Landowner's name and address.
- b. Turnout Number(s).
- c. The name of the person or persons who have the authority to place water orders throughout the year.
- d. The total estimated water requirement for the Water Year.

2. Revised Annual Application(s) for Contract Water Service: Revised Annual Applications for Contract Water Service may be filed at any time, but water will be delivered pursuant to such revised applications only if the Engineer-Manager determines that it is practicable and feasible to do so and District does not assume any obligations for the delivery of water according to such revised applications.

3. Continuous Delivery: Water delivered shall be initiated at approximately 8:00 a.m., and will run continuously day and night until the amount of water ordered for the period has been delivered and no water order will be accepted for less than a 24-hour period.

4. **Water Service Orders:** Orders to turn on or to turn off water or orders to increase or decrease the rate of water delivery shall be made at the District office in person or by telephone by Water User or the person he designates in writing in accordance with Division IV, Section 1c hereof. Such orders shall be made in accordance with the following schedule:

Orders Received Prior to Orders Received After:

9:00 a.m.

on Monday shall be for Tuesday;
on Wednesday shall be for Thursday;
on Friday shall be for Saturday;
on Monday shall be for Wednesday;
on Wednesday shall be for Friday;
on Friday shall be for Sunday;

9:00 a.m.

on Tuesday shall be for Wednesday;
on Thursday shall be for Friday;
on Saturday shall be for Sunday;
on Tuesday shall be for Thursday;
on Thursday shall be for Saturday;
on Saturday shall be for Monday;

Water orders placed after 5:00 p.m. on Saturday or on Sunday will be for Tuesday.

Except in emergencies, water flow shall not be turned on, turned off, increased, or decreased after 9:00 a.m., on the day scheduled.

For the purpose of properly scheduling District's activities, it is desirable that Water User give the District a turn off order at the same time that a turn on order is given.

5. **Delivery Change Within the Same Lateral:** Once water is ordered changes of delivery point within the service area of the same lateral may be made on a less than 24-hour notice, but the Engineer-Manager, as communicated through the Watermaster, will make the decision as whether or not to waive the 24-hour notice.

6. **Emergency Turn Offs:** Water User or the District may in an emergency turn off the supply of water at Water User's turnout. If Water User effects such emergency turn off, he must notify the District office immediately. Water User and anyone effecting such an emergency turn off does thereby agree to assume the defense of and hold harmless the District and its officers, agents, and employees from any and all loss, damage, liability, claims, or causes of action of every nature whatsoever for damage to or destruction of property, including District's property, or for injury to or death of persons, in any manner arising out of or incidental to such emergency turn off. If District effects such emergency turn off, the Water User will be notified as soon as possible as provided in Section 2(j) of the Water Service Contract. In no event shall any liability accrue against District or any of its officers, agents, or employees for any damage, direct or indirect, arising from such temporary discontinuance or reduction of water deliveries.

7. **Unauthorized Adjustments of Flow:** When District meter readings show substantial variation from the ordered flow indicating that the flow has been altered by a Water User, a warning shall be sent to the Water User and if the variations continue, the turnout may be locked by District personnel or service otherwise discontinued until the matter is satisfactorily resolved.

8. Interruptions in Service: Without detracting from Sections 2(f) and 2(g) of the Water Service Contracts, temporary shutdowns may be made by District to make improvements and repairs. Except in an emergency, all affected Water Users will be notified prior to making such temporary shutdowns. District shall not be liable for damage, which may result from interruptions in service.

9. Proration of Water Delivery:

a. System Deficiency: Consistent with the design and operational objectives of District's distribution facilities and giving consideration to requests for water service from all Water Users, as provided in Section 3(b) of the Water Service Contracts and Division IV, Section 1 of these Rules, District will schedule water deliveries and deliver water to Water User as nearly in accord with Water User's requests as is practicable, and District's determinations with regard to such scheduling of water deliveries shall be final and conclusive, however, when total daily orders exceed the delivery capacity of a lateral, water orders will be taken and water delivered on a basis as determined by the Engineer-Manager on a day to day basis by dividing the available lateral capacity by the total Water Service Contract acreage served by that lateral and ordering water that day.

b. Water Shortage: Pursuant to powers granted by Section 43004 of the California Water Code and Article 2(l) of the Water Service Contracts, water will be apportioned within the District, in the event of a shortage, to each Water User upon the basis of the ratio of each Water User's acreage as listed in Exhibit "A" of each contract to the total acreage subject to the District's contracts for agricultural water service.

10. Use of Other Water Supplies: Subject to the provisions of District's contracts with the United States and approval by the Engineer-Manager, a Water User may use water furnished by District concurrently with water from other sources, provided that Water User can demonstrate that the delivery of water furnished by District is less than or equal to the amount of water applied on land eligible for water service within the same period, less the reasonable incidental losses.

11. Waste of Water: Water service delivery will be discontinued to any Water User found to be wasting water, either willfully or carelessly, due to defective or inadequate ditches or pipelines, inadequately prepared land, improper management, or for any other reason. Water service delivery will not be resumed until the conditions causing the waste have been corrected.

12. Farm Turnouts - Connections: Except as provided in Division II, Section 11 (relating to modifications of the system), water delivery will be made only through a District-owned and operated turnout, and the connection from said turnout to the individual Water User's system shall be subject to approval by the Engineer-Manager or his designee. Plans for any subsequent revisions to said connection shall be submitted to the District for approval, in writing, by the Engineer-Manager or his designee. Failure to obtain such approval in the manner provided may result in discontinuance of delivery of water service to the turnout until such approval is obtained.

All deliveries from District's facilities shall be made in a manner so as to prevent water from Water User's system from entering the District's facilities and all normal precautions shall be taken to prevent damage to District's facilities resulting from operation

of the Water User's system. District will not install any additional turnouts in its distribution system except as provided in Division II, Section 11 hereof.

13. Combined Turnouts: Combined turnout means any farm turnout serving more than one Water User. If for any reason (including matters resulting from a transfer into separate ownership of a portion of the lands described in Exhibit "A" to an Water Service Contract as being served by a particular farm turnout and where all the affected land will continue to be served by the designated turnout), the lands of two or more Water Users are to be served by a single turnout, such turnout is a combined turnout and the following rules shall apply:

a. Combined Turnout Agreement and Consent to Easement: Water service will be furnished through a combined turnout only upon execution of a "Combined Turnout Agreement and Consent to Easement" by each Water User to be served through the combined turnout. Such agreement shall be on forms provided by the District and executed and completed in a manner satisfactory to District. District shall be under no obligation to deliver water to a Water User through a combined turnout until such agreement has been executed and filed with the District. Combined turnout agreements remain in effect unless terminated by all affected parties.

b. Rate of Delivery: The "Rate of Delivery" for a combined turnout as shown in Exhibit "A" of Water Service Contract(s) and/or Assumption Agreement(s) is a combined rate of delivery for the turnout. Therefore, when the combined water service delivery requests of Water Users exceed the delivery capacity of the turnout, Engineer-Manager may prorate water service delivery to conform to such delivery capacity.

14. Delivery of Municipal, Industrial, and Domestic Water: No deliveries of water for municipal, industrial, and domestic uses will be made except pursuant to an Water Service Contract between District and a public entity or other entity having necessary legal and financial capability to furnish such service.

The basic rules and regulations governing the delivery of irrigation water shall apply also to the delivery by the District of municipal, industrial, and domestic water, and the term "Water User" as used herein shall also refer to users of said municipal, industrial, and domestic water. Since water shortages and interruptions in delivery may occur, the users of municipal, industrial, and domestic water must have secondary sources of supply or adequate storage for temporary use.

15. Condition of Water: Water furnished by the District is in a raw, untreated condition, and, as a result, is considered to be unfit for human consumption without treatment.

16. Section 592 of the Penal Code of the State of California: Attention is directed to the provisions of Section 592 of the California Penal Code as follows:

"Canals, ditches, flumes or reservoirs

- a) Every person who shall, without authority of tile owner or managing agent, and with intent to defraud, take water from any canal, ditch, flume, or reservoir used for the purpose of holding or conveying water for manufacturing, agricultural, mining, irrigating, generation of power, or domestic uses is guilty of a misdemeanor.

- b) If the total retail value of all the water taken is more than four hundred dollars (\$400), or if the defendant has previously been convicted of an offense under this section or any former section that would be an offense under this section, or of an offense under the laws of another state or of the United States that would have been an offense under this section if committed in this state, then the violation is punishable by imprisonment in the county jail for not more than one year, or in the state prison."

DIVISION V: POLICIES AND PROCEDURES FOR ESTABLISHING, FIXING AND COLLECTION OF CHARGES AUTHORIZED BY SECTIONS 43006 AND 47180 OF THE WATER CODE FOR GENERAL ADMINISTRATION AND GENERAL PROJECT SERVICES RENDERED BY THE ARVIN-EDISON WATER STORAGE DISTRICT

1. **Policies:** Under present Project conditions and as declared by Board Resolution Nos. 73-15 and 73-23, it is necessary that the following charges be established, namely;

a. **General Administrative Service Charge:** Being the amount of money necessary to be raised by District to provide for and to recover such of District's costs of salaries, services, supplies, and other expenses as are applicable to the general administration of the affairs of District, plus a reasonable percentage not to exceed 15 percent for delinquency and the percentage necessary to cover cost of collection.

Said charge shall be fixed annually in such amount as to reflect that portion of the costs of such District services as reflect the benefits to lands within District by reason of being in an organized District, which is operating the Project and importing supplemental water.

In order that such charges be collected from all persons receiving the benefit thereof and that such charges be collected in proportion, as nearly as practicable, to such services rendered, said charge shall be fixed at an equal rate per acre upon each acre of assessable land within the District; EXCEPTING, that a minimum rate per parcel shall be established for tracts of land less than one acre in area and further EXCEPTING those lands within both this District and the Wheeler Ridge-Maricopa Water Storage District, which are receiving contract water service from said latter District, as provided in Board Resolution No. 73-4.

b. **General Project Service Charge:** Being the amount of money necessary to be raised by District to provide for and to recover such of District's costs, plus a reasonable percentage not to exceed 15 percent for delinquencies and the percentage necessary to cover costs of collection, incurred by reason of federal contracts and operation of District's Adopted Project, in excess of the General Administrative Service Charge and such tolls and charges as are to be collected for surface water service as provided in District's Water Service Contracts.

Said charge shall be fixed annually in such amount as to reflect that portion of the costs of such District services as reflect that portion of Project services and benefits arising to certain lands within District as a consequence of the federal contracts and operation of District's Adopted Project, designed to provide an assured water supply on a long-term basis by the importation of supplemental water. Such general Project services

and benefits accrue to all lands using or having the potential to use surface water service by reason of an Water Service Contract with the District and to all other lands relying upon groundwater in connection with the development thereof, which lands, as a consequence of District's operation will be in a long-term stabilized water basin.

In order that such charges be collected from all persons receiving the benefit thereof and that such charges be collected in proportion, as nearly as practicable to the services rendered, the charges shall be fixed at an equal rate per acre upon each acre of such assessable land; EXCEPTING, that a minimum rate per parcel shall be established for tracts of land less than one acre in area and further EXCEPTING lands within both this District and the Wheeler Ridge-Maricopa Water Storage District which are receiving contract water service from said latter District and further EXCEPTING that the charge for other lands located within the boundaries of both Districts shall not exceed the higher of a charge established by either said district reflecting similar benefits and services reflected in this charge as provided in Board Resolution No. 73-4.

2. Procedures: The following procedures are established for fixing and collecting the foregoing charges, namely:

a. Until such time as these Rules are changed as provided in Subparagraph e hereof, at the regular meeting in April or at such other time as may be announced at said meeting, the Board shall consider, determine, and by resolution fix the amount of such charges for the current Water Year. In compliance with Section 47980 of the Water Code, said resolution shall fix the total amount of each such charge; the total amount to be collected by reason of such charges, the percentage for delinquency and cost of collection attributable to such charges; the minimum charge for parcels less than one acre in area; declare the facts necessary to compute the charges to be applied to the lands within both this District and the Wheeler Ridge-Maricopa Water Storage District as required by the provisions of Board Resolution No. 73-4 or any amendments thereto; set the time and place of hearing of objections to the roll as provided in Subparagraph c hereof, and determine the newspaper or papers in which notice shall be published.

b. In accordance with the provisions of Section 47980(b) of the Water Code, the District Treasurer shall prepare a roll setting forth the assessee parcels and assessee names for each parcel of assessable land in the District, determined in accordance with the provisions of Chapter 3, Part 1, Division 14 (Commencing with Section 39050) of the Water Code and matters on file in District's records; the acreage assessed to each such assessee according to District's records; the classification of each such tract of land and prepare plat maps in accordance with said roll.

The Treasurer shall determine the preliminary rates per acre for said charges, which rates shall be based upon the matters set forth in said roll and the determinations of the Board and shall be separately stated as a rate per acre for parcels receiving only an Administrative Service Charge and a composite rate for those lands receiving the General Administrative and Project Service Charges.

c. Said roll, plat maps, and preliminary rates shall be filed with the District Secretary and be available for public inspection at the District office. The District Secretary shall forthwith give notice of filing of said roll, which notice shall set forth the preliminary rates per acre, the minimum charge for parcels less than one acre and the charge

applicable to those lands in both said districts and declare the time and place set by the Board when the Board will meet and hear any objections to the charges established for said respective tracts of land in accordance with the matters set forth in said roll. Said notice shall be published once a week for two successive weeks, as provided in Section 39057 of the Water Code and by depositing in the mail a copy of said notice directed to each holder of title to lands within the District at their last known address as set forth in said roll. The first publication shall be at least three weeks (21 days) prior to the date of said hearing, and mailing shall be completed at least 10 days prior to said hearing date.

d. At the time and place for hearing of objections the Board shall consider such objections and make such corrections to the roll as are necessary and proper. Upon conclusion of the hearing, the Board shall adopt said roll as finally fixed and determined; make such changes in the preliminary rates per acre necessitated thereby; order the Treasurer to certify said roll; declare that said charges be collected by the County of Kern pursuant to the provisions of Article 4, Part 9, Chapter 13, Division 14 (commencing with Section 47980) of the Water Code and determine the District account at the county to which said funds shall be deposited when collected.

On or before July 15 and no later than August 10, the Secretary shall file with the County Auditor certified copies of said final roll, the resolution fixing charges, and the resolution adopting said roll, fixing the rates per acre, and ordering collection by the County. Said Secretary shall notify the County Tax Collector of said filing of the roll, and furnish them certified copies of said resolution.

e. These Rules in **Division V** shall continue until such time as the Board determines, pursuant to noticed public hearing, that said charges, or either of them, are to be fixed on some basis other than that herein provided or until such time as there has been a reassessment of Project costs as provided in Section 46355 of the Water Code; PROVIDED, HOWEVER, pursuant to petition of the holders of title to 10 percent of the land to receive such charge or charges filed with the Board not later than five days preceding the regular meeting date in February, the Board shall set a noticed public hearing to consider whether such policy should be continued or the amount of such charge or charges or all of such matters, as may be specified in said petition.

Notice of time and place of such public hearing, specifying the matters to be considered, shall be published once a week for two successive weeks, as provided in Section 39057 of the Water Code, and by depositing in the mail, at least three weeks before said hearing date, a copy of the notice directed to each holder of title to lands within the District at their last known address as determined in accordance with Chapter 3, Part 1, Division 14 (commencing with Section 39050) of the Water Code. Said date of hearing shall not be less than 30 days after the first date of publication.

ATTACHMENT

D

Arvin-Edison Water Storage District

2005 Charges

Standby - \$/ac		\$32.00
Water Use - \$/AF		
<u># Lifts</u>	<u>Water</u>	<u>Energy</u> <u>Total</u>
1	\$30.00	\$23.00 \$53.00
2	\$30.00	\$35.00 \$65.00
3	\$30.00	\$47.00 \$77.00
4	\$30.00	\$59.00 \$89.00
5	\$30.00	\$71.00 \$101.00
6	\$30.00	\$83.00 \$113.00
USBR Surcharges - \$/AF		
Full Cost 202(3)		\$6.02
Full Cost 205(a)(3)		\$10.54
Municipal and Industrial		\$50.00
Miscellaneous Water		
Cattle Water		\$64/mo.
Construction Water		\$200/dy

2004 Charges

Standby - \$/ac		\$49.00
Water Use - \$/AF		
<u># Lifts</u>	<u>Water</u>	<u>Energy</u> <u>Total</u>
1	\$37.00	\$9.00 \$46.00
2	\$37.00	\$18.00 \$55.00
3	\$37.00	\$27.00 \$64.00
4	\$37.00	\$36.00 \$73.00
5	\$37.00	\$45.00 \$82.00
6	\$37.00	\$54.00 \$91.00
USBR Surcharges - \$/AF		
Full Cost 202(3)		\$6.09
Full Cost 205(a)(3)		\$10.58
Municipal and Industrial		\$50.00
Miscellaneous Water		
Cattle Water		\$32/mo.
Construction Water		\$100/dy

Water Year 2005
Billing Date October 31, 2005
Turnout Number T-13

STANDBY CHARGE - \$/ACRE	WATER USE CHARGE - \$/ACRE FOOT
.17 Acres @ \$32.00 Per Acre = 09.44 May Be Paid In 8 Equal payments Of \$79.00 Plus One Of 77.44, March Through November	Energy Pump Lift(s) 1 @ \$23.00 \$ 23.00 Energy Pump Lift(s) 2 @ 12.00 24.00 Water Component 30.00 202(3) & 205(a)(3) 0.00 M&I 0.00 TOTAL OF WATER USE RATES \$ 77.00

2005 WATER YEAR
WATER USAGE - ACRE FEET

MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	AF/AC
0	0	0	0	0	0	0	0	0	0	0	0	0.00
TOTAL ACRE FEET 0												

STANDBY CHARGE AND WATER USE CHARGE

Month	Due Date	Standby Charge	Use Charge	Penalty Interest	Month Total	Amount Paid	Balance Due
March	4/10	\$79.00	\$0.00	\$0.00	\$79.00	\$0.00	\$79.00
April	5/10	\$79.00	\$0.00	\$0.00	\$79.00	\$0.00	\$158.00
May	6/10	\$79.00	\$0.00	\$0.00	\$79.00	\$79.00	\$158.00
June	7/10	\$79.00	\$0.00	\$0.00	\$79.00	\$79.00	\$158.00
July	8/10	\$79.00	\$0.00	\$0.00	\$79.00	\$79.00	\$158.00
August	9/10	\$79.00	\$0.00	\$0.00	\$79.00	\$79.00	\$158.00
September	10/10	\$79.00	\$0.00	\$0.00	\$79.00	\$79.00	\$158.00
October	11/10	\$79.00	\$0.00	\$0.00	\$79.00	\$79.00	\$158.00
November	12/10	\$0.00	\$0.00	\$0.00	\$79.00	\$79.00	\$158.00
December	1/10	N/A	\$0.00	\$0.00	\$0.00	\$0.00	
January	2/10	N/A	\$0.00	\$0.00	\$0.00	\$0.00	
February	3/10	N/A	\$0.00	\$0.00	\$0.00	\$0.00	
TOTAL BILLED:		\$632.00	\$0.00	\$0.00	\$632.00	\$474.00	\$158.00
PAYMENTS RECEIVED:		\$474.00	\$0.00	\$0.00			
BALANCE:		\$158.00	\$0.00	\$0.00			

Notes:

Due and Payable: \$158.00

**ARVIN-EDISON WATER STORAGE DISTRICT
HISTORY OF WATER COSTS AND ASSESSMENTS**

Water Year	Water Service Charges - \$/AF			Total \$/AC	Standby \$/AC	GA & GP (\$/AC)	Total Costs	
	Power	Water	Total				(\$/AC)	(\$/AF)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1966	2.70	0.00	2.70	7.43	33.00	0.00	40.43	14.70
1967	2.70	0.00	2.70	7.43	33.00	0.00	40.43	14.70
1968	2.70	0.00	2.70	7.43	33.00	0.00	40.43	14.70
1969	2.70	0.00	2.70	7.43	33.00	0.00	40.43	14.70
1970	2.70	0.00	2.70	7.43	33.00	0.00	40.43	14.70
1971	2.70	0.00	2.70	7.43	33.00	0.00	40.43	14.70
1972	2.70	0.00	2.70	7.43	33.00	0.00	40.43	14.70
1973	2.70	0.00	2.70	7.43	33.00	6.65	47.08	17.12
1974	2.70	0.00	2.70	7.43	33.00	6.65	47.08	17.12
1975	2.70	0.00	2.70	7.43	33.00	6.65	47.08	17.12
1976	2.70	0.00	2.70	7.43	33.00	6.65	47.08	17.12
1977	2.70	0.00	2.70	7.43	33.00	6.65	47.08	17.12
1978	7.20	0.00	7.20	19.80	44.00	6.65	70.45	25.62
1979	7.20	0.00	7.20	19.80	49.50	6.65	75.95	27.62
1980	7.20	0.00	7.20	19.80	49.50	6.65	75.95	27.62
1981	7.20	0.00	7.20	19.80	68.75	6.65	95.20	34.62
1982	7.20	0.00	7.20	19.80	68.75	0.00	88.55	32.20
1983	11.00	0.00	11.00	30.25	68.75	0.00	99.00	36.00
1984	13.50	0.00	13.50	37.13	74.25	6.65	118.03	42.92
1985	18.90	0.00	18.90	51.98	90.75	6.65	149.38	54.32
1986	24.30	0.00	24.30	66.83	74.25	6.65	147.73	53.72
1987	27.00	0.00	27.00	74.25	74.25	6.65	155.15	56.42
1988	27.00	0.00	27.00	74.25	74.25	6.65	155.15	56.42
1989	27.00	0.00	27.00	74.25	79.75	6.65	160.65	58.42
1990	27.00	5.00	32.00	88.00	79.75	6.65	174.40	63.42
1991	27.00	10.00	37.00	101.75	79.75	6.65	188.15	68.42
1992	27.00	6.00	33.00	90.75	101.75	6.65	199.15	72.42
1993	24.30	12.00	36.30	99.83	110.00	17.55	227.38	82.68
1994	24.30	21.00	45.30	124.58	118.25	18.00	260.83	94.85
1995	24.30	41.00	65.30	179.58	71.00	23.00	273.58	99.48
1996	24.30	41.00	65.30	179.58	71.00	23.00	273.58	99.48
1997	24.30	41.00	65.30	179.58	71.00	23.00	273.58	99.48
1998	20.80	44.00	64.80	178.20	57.00	23.00	258.20	93.89
1999	20.80	30.00	50.80	139.70	57.00	23.00	219.70	79.89
2000	20.80	30.00	50.80	139.70	57.00	23.00	219.70	79.89
2001	20.80	30.00	50.80	139.70	48.00	10.00	197.70	71.89
2002	20.80	30.00	50.80	139.70	48.00	10.00	197.70	71.89
2003	23.40	37.00	60.40	166.10	49.00	23.00	238.10	86.58
2004	23.40	37.00	60.40	166.10	49.00	23.00	238.10	86.58
2005	42.20	30.00	72.20	198.55	32.00	23.00	253.55	92.20
2006	54.80	44.00	98.80	271.70	0.00	54.00	325.70	118.44

Shaded cells indicate estimated or proposed

07/23/06

NOTES: (1) MARCH THROUGH FEBRUARY

WTR&PWRcharge2.xls

(2) POWER CHARGE BASED ON AN AVERAGE OF 2.6 LIFTS

(3) REQUIRED PURSUANT TO RECLAMATION LAW

(4) SUM OF (2) AND (3)

(5) 2.75 X (4). ASSUMES A 2.75 AF/AC WATER APPLICATION RATE

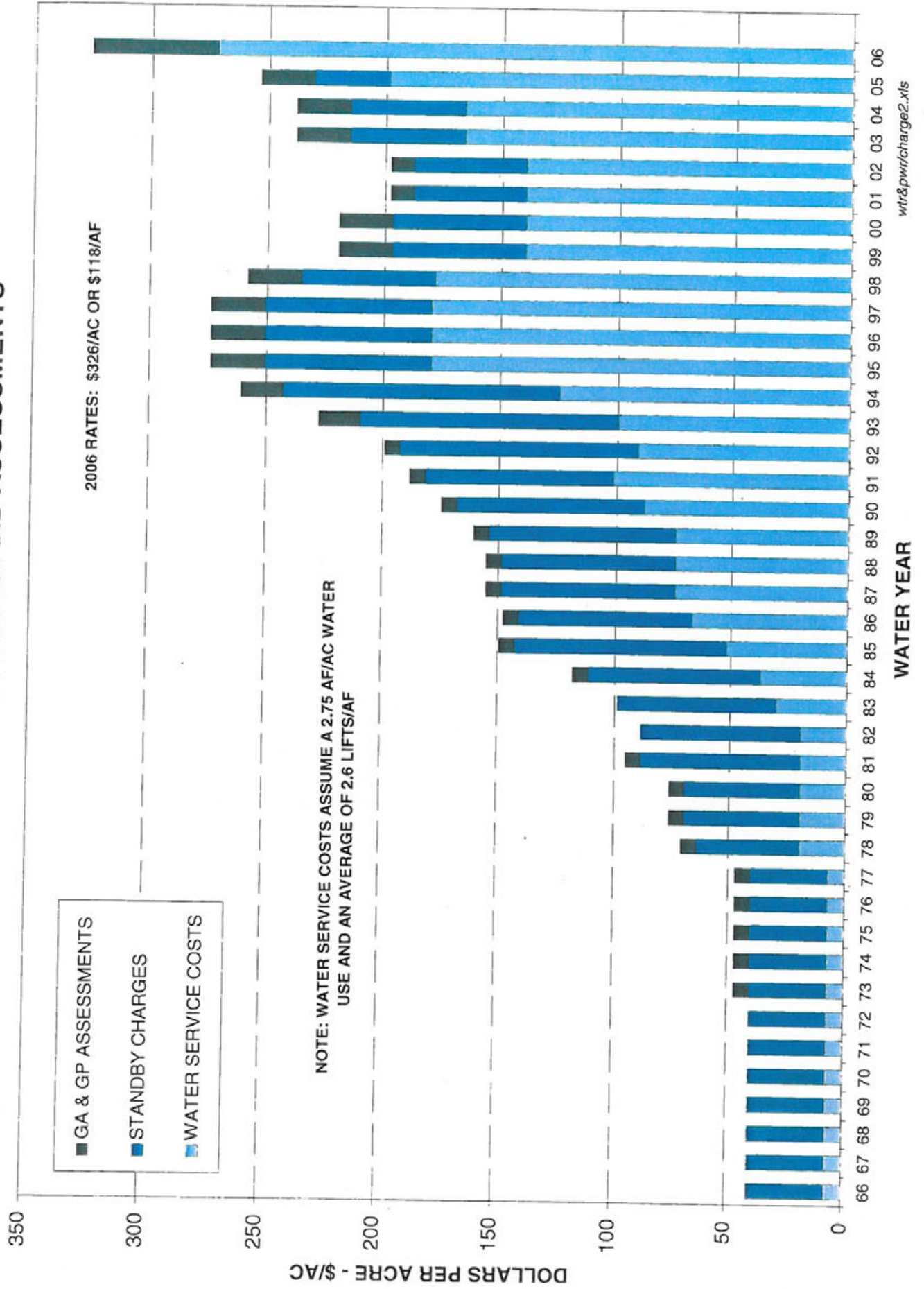
(6) FIXED CHARGE BASED ON CONTRACT ACRE-FT THROUGH 1994 (ASSUMES 2.75 AF/AC), THEN BASED ON CONTRACT \$/AC RATES FROM 1995 ON. BEGINNING IN 2006, CREDITED TOWARDS WATER USE CHARGES.

(7) ESTABLISHED IN 1973, WAIVED FOR 1982 & 1983, CONSISTS OF GENERAL ADMINISTRATIVE AND GENERAL PROJECT SERVICE CHARGES

(8) (5) + (6) + (7). TOTAL PER ACRE COSTS FOR WATER SERVICE AND ASSESSMENTS

(9) (8) / 2.75 ASSUMES A 2.75 AF/AC WATER APPLICATION RATE

ARVIN-EDISON WATER STORAGE DISTRICT HISTORY OF WATER COSTS AND ASSESSMENTS



ATTACHMENT

E

8. **Interruptions in Service:** Without detracting from Sections 2(f) and 2(g) of the Water Service Contracts, temporary shutdowns may be made by District to make improvements and repairs. Except in an emergency, all affected Water Users will be notified prior to making such temporary shutdowns. District shall not be liable for damage, which may result from interruptions in service.

9. **Proration of Water Delivery:**

a. **System Deficiency:** Consistent with the design and operational objectives of District's distribution facilities and giving consideration to requests for water service from all Water Users, as provided in Section 3(b) of the Water Service Contracts and Division IV, Section 1 of these Rules, District will schedule water deliveries and deliver water to Water User as nearly in accord with Water User's requests as is practicable, and District's determinations with regard to such scheduling of water deliveries shall be final and conclusive, however, when total daily orders exceed the delivery capacity of a lateral, water orders will be taken and water delivered on a basis as determined by the Engineer-Manager on a day to day basis by dividing the available lateral capacity by the total Water Service Contract acreage served by that lateral and ordering water that day.

b. **Water Shortage:** Pursuant to powers granted by Section 43004 of the California Water Code and Article 2(l) of the Water Service Contracts, water will be apportioned within the District, in the event of a shortage, to each Water User upon the basis of the ratio of each Water User's acreage as listed in Exhibit "A" of each contract to the total acreage subject to the District's contracts for agricultural water service.

10. **Use of Other Water Supplies:** Subject to the provisions of District's contracts with the United States and approval by the Engineer-Manager, a Water User may use water furnished by District concurrently with water from other sources, provided that Water User can demonstrate that the delivery of water furnished by District is less than or equal to the amount of water applied on land eligible for water service within the same period, less the reasonable incidental losses.

11. **Waste of Water:** Water service delivery will be discontinued to any Water User found to be wasting water, either willfully or carelessly, due to defective or inadequate ditches or pipelines, inadequately prepared land, improper management, or for any other reason. Water service delivery will not be resumed until the conditions causing the waste have been corrected.

12. **Farm Turnouts - Connections:** Except as provided in Division II, Section 11 (relating to modifications of the system), water delivery will be made only through a District-owned and operated turnout, and the connection from said turnout to the individual Water User's system shall be subject to approval by the Engineer-Manager or his designee. Plans for any subsequent revisions to said connection shall be submitted to the District for approval, in writing, by the Engineer-Manager or his designee. Failure to obtain such approval in the manner provided may result in discontinuance of delivery of water service to the turnout until such approval is obtained.

All deliveries from District's facilities shall be made in a manner so as to prevent water from Water User's system from entering the District's facilities and all normal precautions shall be taken to prevent damage to District's facilities resulting from operation

ATTACHMENT

F



Edison Road

W15

Upper Pond

Lower Pond

W16

W17

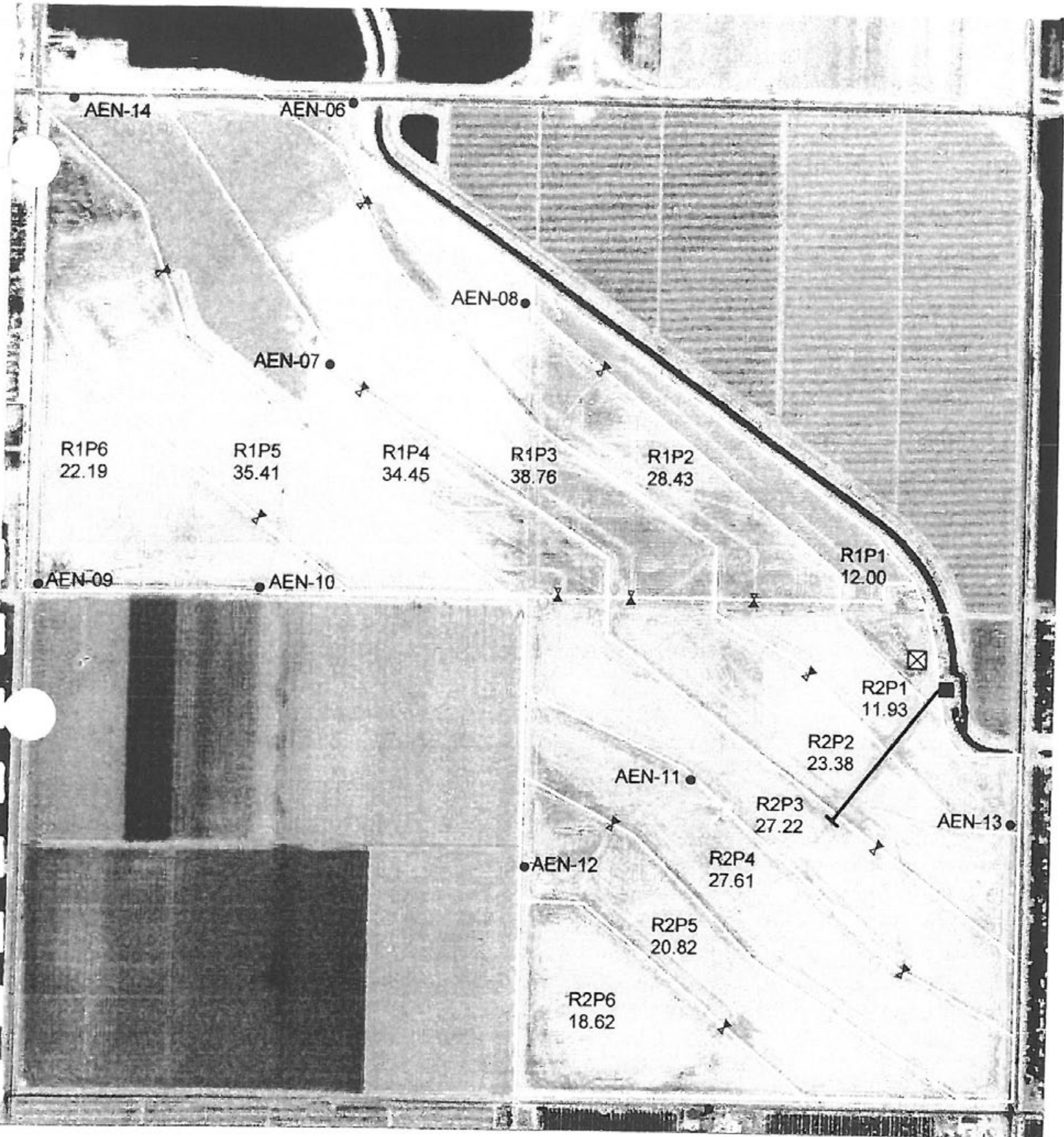
Muller Road

W18

ARVIN-EDISON
WATER STORAGE DISTRICT

Balancing Reservoir

<u>Ponds</u>	<u>Acres</u>	<u>Wells</u>
2	54	4



Arvin-Edison Water Storage District
North Canal Spreading Basin
and Well Field

	Ponds	Acres	Wells
ivity	6	186	6
ssure	6	114	3
Total	12	300	9



0.1 0 0.1 0.2 Miles

Legend

Interbasin Structures

M.C. House

Pump Plant & Discharge Pipe

0' 500' 1000'



AEWSD PIEZOMETERS 1,2,3

NORTH CANAL

BEAR MOUNTAIN BLVD.

DISTRICT HEADQUARTERS

ARVIN-EDISON
WATER STORAGE DISTRICT
**Sycamore Spreading Basin
and Well Field**

<u>Ponds</u>	<u>Acres</u>	<u>Wells</u>
68	569	33

SYCAMORE CHECK STRUCTURE



RANCHO ROAD

ARVIN-EDISON
WATER STORAGE DISTRICT

**Tejon Spreading Basin
and Well Field**

	<u>Ponds</u>	<u>Acres</u>	<u>Wells</u>
Gravity	34	238	17
Pressure	<u>38</u>	<u>210</u>	<u>9</u>
Total	72	448	26

ATTACHMENT

G

Arvin-Edison Water Storage District Groundwater Management Plan

6/5/03



1801 21st Street, Suite 6
Bakersfield, CA 93301
Office Phone (661) 327-1985

Table of Contents

I. Introduction	4
A. Background and History.....	4
B. Purpose and Goal.....	8
C. Authority.....	8
D. Documentation of Public Participation	9
II. Description of District.....	9
A. Management Area	9
1. Location.....	9
2. Topography	9
3. Climate	10
B. Water Supplies.....	10
1. Surface Water.....	10
2. Groundwater.....	11
C. Land Use.....	11
D. Distribution System.....	11
E. Water Demand and Deliveries	12
1. Historic.....	12
2. Projected Future	13
F. Other Agencies and Programs related to Groundwater in AEWS 13	13
III. Groundwater Conditions.....	14
A. Groundwater Basin Description	14
B. Physical Structure	14
C. District Aquifer Characteristics	15
D. Groundwater Monitoring Activities	17
1. Well water-level measurement.....	17
2. Well water level mapping	17
3. Well water level graphing (hydrographs).....	17
4. Recharge (spreading) water measurement	18
5. Recovery (extraction) water measurement.....	18
6. Well water quality analysis	18
7. Well water quality mapping and graphing.....	18
8. Well location surveys.....	19
9. Hydrologic inventory	19
10. Groundwater modeling.....	19
E. Historic and Current Conditions	19
1. Groundwater Levels	19
2. Water Quality	20
F. Issues of Concern	21
1. Extraction and Perennial Yield	21
2. Groundwater Quality.....	22
3. Inelastic Land Surface Subsidence.....	23
IV. Basin Management Objectives	24
A. Federal Goals and Policy.....	24

B. State Goals and Policy	25
1. Statewide Goals and Policy	25
2. State Goals and Policy for the Tulare Lake Basin	26
3. Objectives for Groundwater	26
C. Kern County Water Agency Objectives	27
D. District Management Objectives	28
V. Components of the Groundwater Management Plan	31
A. Control of Saline Water Intrusion	31
B. Identification and Management of Wellhead Protection Areas and Recharge Areas	32
C. Regulation of the Migration of Contaminated Groundwater	33
D. Administration of Well Abandonment and Destruction Program	33
E. Mitigation of Conditions of Overdraft	34
F. Groundwater Replenishment	35
G. Groundwater Monitoring	35
H. Management of Groundwater Extractions	35
I. Identification of Well Construction Policies	36
J. Construction and Operation of Groundwater Management Facilities	36
K. Development of Relationships with Federal, State and Local Regulatory Agencies	37
L. Review of Land Use Plans and Coordination with Land Use Planning Agencies	38
M. Monitoring and Management of Inelastic Land Surface Subsidence	39
N. Changes in Surface Flow and Surface Water Quality that Directly affect Groundwater Levels or Quality or are caused by Groundwater Pumping	40
O. Plan to Involve Other Agencies	41
P. Adoption of Monitoring Protocols	42
Components Recommended by DWR	42
Q. Advisory Committee of Stakeholders	43
R. Periodic Reports Summarizing Groundwater Basin Conditions and Groundwater Management Activities	44
S. Periodic Re-Evaluation of Entire Plan	44
VI. Program Costs, Funding, and Potential Fees	45
FIGURES	46
Appendices	46

Attachments

A. List of Exhibits:

1. Tables
2. Figures
3. Appendices

B. References

associated well fields through which water is stored in the underground and later recovered when required through District wells.

Spreading Works - A program of investigation and analysis was conducted by the District's engineering consultants prior to final design to determine the most favorable location and the area needed for the spreading basins. The Sycamore Spreading Works comprises a total area of 569 acres and is located on the alluvial fan of Sycamore Creek near the middle of the District. The Tejon Spreading Works is located on the Tejon Creek alluvial fan approximately six miles south of the Sycamore Spreading Works and covers an area of 516 acres. In Water Year 2000, the construction of the North Canal Spreading Works was completed. Located approximately 4 miles northwest of Sycamore, this new facility covers about 350 acres. All three facilities are shown on the attached map of the District.

Diversion of water into the spreading ponds is accomplished by gravity flow from the Arvin-Edison Canal through turnout structures equipped with manually operated slide gates. A portion of the Tejon Spreading Works comprising about 260 acres is located upslope from the Arvin-Edison Canal, requiring a 65-foot maximum pumping lift. Because electrical energy is required, the Tejon Pumping Plant is operated only when the availability of water exceeds the capacity of the Sycamore Spreading Works and the gravity portion of the Tejon Spreading Works. The Tejon Pumping Plant has fourteen 200 horsepower, electrically-driven pumps which have a capability of delivering a total of 280 cubic feet per second. The North Canal Spreading Works also consists of a pumped area and a gravity area. Two 100 hp electrically-driven pumps with a combined capacity of 40 cfs serve approximately 114 net acres, with the remaining 186 acres served by gravity through a 60" diameter reinforced concrete pipeline.

The principal operating difficulty experienced to date has been maintaining the spreading basin infiltration rates over prolonged periods of spreading. One factor, which contributes heavily to these difficulties, is that water delivered from the Cross Valley and

Friant-Kern Canals occasionally contains silt concentrations which exceed acceptable levels for spreading. Methods employed to maintain or restore infiltration rates include: (1) periodic drying of surface soils; (2) promotion of grass growth on pond surfaces; (3) termination of spreading operations when total suspended solids in the imported water exceeds 25 parts per million; (4) restriction of vehicular travel within basins; (5) scarification of surface soils by chiseling or discing; and (6) removal of silt accumulations by mechanical means.

Well Fields - The North Canal, Sycamore, and Tejon Well Fields are associated with the previously described spreading works and include 72 wells. Energy to operate the wells is supplied through District operated 12 kv power distribution facilities.

District wells are of the rotary, gravel envelope type of construction. Each well is equipped with 16-inch diameter casing, a 6 or 7-stage pump bowl assembly and a 300 to 400 hp electrically powered motor. The wells range in depth from 750 to 1,078 feet with pump bowl settings varying from 450 to 600 feet. The individual pumping units are designed to produce approximately 4 cfs at a total pumping head of approximately 450 feet.

The North Canal Spreading Works is comprised of 9 wells, all of which are located within the facility boundaries. The Sycamore Well Field is comprised of a total of 33 wells, 26 of which are located within the spreading works, and the remainder being located west of and adjacent to the Sycamore Spreading Works. The Tejon Well Field consists of 25 wells, 20 of which are located within the spreading works area, and 5 are located outside the peripheral dikes. In addition to the 67 wells included in the North Canal Spreading Works, Sycamore, and Tejon Fields, 5 wells of similar design are located along the Arvin-Edison Canal in the northern area of the District, bringing the total number of District wells to 72.

PROJECT ACCOMPLISHMENTS

Project operations commenced in July 1966, with the first diversions of water to the

Sycamore Spreading Works. Since that time, over 5.5 million acre-feet of water has been imported by the District. At the end of the 2003 Water Year, over 1.6 million acre-feet of water had been percolated to the underground and nearly 4.8 million acre-feet had been delivered directly to surface water users.

No significant groundwater extractions were made by the District prior to 1968. Beginning in March 1968, it became necessary to operate District wells for the first time to supplement the available surface water supply. Figures 7 and 8 reflect the history of percolation and extractions from the District's spreading and water recovery facilities.

Groundwater level fluctuations in an observation well located approximately one-quarter mile north of Sycamore Spreading Works are illustrated in Figure 9. Heavy extractions of groundwater were required to maintain firm water service during the 1972, 1976, 1977, 1987-92, and 1994 Water Years, during which the District's imported water supply was severely reduced. Such extractions were responsible for the sharp draw-down in water levels indicated to have occurred during those years.

As a result of the accumulation of nearly 500,000 acre-feet of water in groundwater storage achieved by the end of the 1980 Water Year, and the availability of additional quantities of firm water as a result of the Cross Valley Canal Exchange, the District increased its annual firm water service commitment to approximately 160,300 acre-feet.

The estimated net percolation (i.e., diversions to spreading less evaporation), ground water extraction, accumulation of groundwater storage and direct delivery of imported surface water which have occurred since 1966 are summarized by water year in Figure 7.

Stabilization of Groundwater Levels - The effect of District operations, which were initiated in July 1966, is reflected by a general stabilization of groundwater levels, as graphically illustrated in Figure 10. The water level decline shown to have occurred during the pre-project period represents a continuation of the average annual long-term decline in

groundwater levels of 7 to 8.5 feet per year throughout most of the District. Under non-project conditions, it is estimated that by the end of the 2003 Pumping Season average groundwater levels in the Arvin-Edison area would have exceeded 600 feet. A review of project versus non-project conditions is presented in Figure 10 and a hydrologic inventory in Figure 11.

The effect of the project operations has been to provide a firm surface water supply to a large number of irrigators whose well supply was failing or who were pumping groundwater of unsatisfactory quality. In addition, the importation of a substantial quantity of surface water since the inception of District operations has resulted in a reduction in subsurface inflow from neighboring areas and a significant improvement in both groundwater depths and water quality for those irrigators in the District who continue to rely on groundwater.

ARVIN-EDISON/METROPOLITAN WATER MANAGEMENT PROGRAM

In December 1997, the District entered into a 25-year agreement with the Metropolitan Water District of Southern California (MWD), in which the District agreed to bank approximately 250,000 AF of MWD State Water Project Supply and return said water in certain drought years. Said water will be returned during off-peak times so as not to interfere with normal, historic District operations. In order to accomplish this program, roughly \$25 million in new facilities were constructed, which included 500 acres of new spreading, 15 new groundwater wells, and a 4½ mile, bi-directional intertie pipeline connecting the terminus of the District's south canal with the California Aqueduct, construction of which was completed in 2002. The District will utilize the new facilities to firm up its own water supplies as well as for effecting banking programs for others. Funding for the new construction is accomplished by the collection of water management fees as water is banked for and returned to MWD. The District is now able to utilize a total of 72 groundwater wells and close to 1,500 acres of spreading basins.

ATTACHMENT

H

ARVIN-EDISON WATER STORAGE DISTRICT WATER RESOURCE MANAGEMENT PROGRAM

Yellow Book 2006

Water Year 2005 Results

TABLE OF CONTENTS

	<u>Page</u>
INTRODUCTION	1
THE DISTRICT	1
IMPORTED WATER SUPPLY	3
CONCEPT OF PROJECT OPERATIONS	5
WATER SERVICE CHARGES	7
PROJECT FACILITIES	9
PROJECT ACCOMPLISHMENTS	14
SUMMARY	20

LIST OF FIGURES

FIGURE 1: A TEN YEAR SUMMARY OF LAND USE	2
FIGURE 2: HISTORY OF FRIANT-KERN ALLOCATION	4
FIGURE 3: CROSS VALLEY CANAL WATER EXCHANGE PROGRAM	6
FIGURE 4: DIAGRAMMATIC SECTION OF ARVIN-EDISON'S WATER RESOURCES MANAGEMENT PROGRAM	8
FIGURE 5: HISTORY OF WATER CHARGES AND ASSESSMENTS (TABLE)	10
FIGURE 6: HISTORY OF WATER CHARGES AND ASSESSMENTS (GRAPH)	11
FIGURE 7: PROJECT OPERATIONS SUMMARY	17
FIGURE 8: ACCUMULATION OF UNDERGROUND STORAGE	18
FIGURE 9: HYDROGRAPH OF WATER LEVEL FLUCTUATIONS IN AN OBSERVATION WELL NEAR SYCAMORE SPREADING WORKS	19
FIGURE 10: AVERAGE GROUNDWATER DEPTH IN ARVIN-EDISON	21
FIGURE 11: HYDROLOGIC INVENTORY	22
DISTRICT MAP	23

THE ARVIN-EDISON WATER STORAGE DISTRICT WATER RESOURCES MANAGEMENT PROGRAM

INTRODUCTION

The Arvin-Edison Water Storage District of Kern County, California, through actions of its Board of Directors and Bookman-Edmonston Engineering, Inc., which was employed to design and supervise the construction of the District's water distribution facilities, has successfully completed a project to introduce supplemental water into an area of substantial groundwater overdraft. The District's project, construction of which was initiated in 1964 and completed in 1968, reflects the implementation of a plan for the integrated management of a supplemental imported surface water supply with existing groundwater reserves providing a **true conjunctive use program**.

THE DISTRICT

The Arvin-Edison Water Storage District was organized in 1942 under California Water Storage District law (Division 14 of the California Water Code) for the expressed purpose of providing an agency to contract with the United States for water and power service from the Central Valley Project. The District is comprised of approximately 132,000 acres of prime agricultural land located in the southeasterly portion of the San Joaquin Valley of California and lies entirely within Kern County. Approximately 100,000 acres are developed to irrigated crops, with vineyards, truck crops, potatoes, cotton, citrus, and orchards presently predominating. A summary of land use, surveyed each spring, is shown as **Figure 1**.

Long-term average rainfall in the District is about 8.2 inches per year and occurs largely during winter and spring months. Therefore, agriculture is almost entirely dependent upon irrigation. The absence of perennial surface streams in the District required that all irrigation water, prior to 1966, be obtained from groundwater reserves.

ARVIN-EDISON WATER STORAGE DISTRICT
A 10 YEAR SUMMARY OF LAND USE (1996 - 2005)

LAND USE *(1) *(2)	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Field Crops										
Cotton	15,535	12,974	7,764	6,660	7,132	8,661	5,771	4,919	5,053	3,098
Milo & Field Corn	354	410	709	371	97	373	578	785	753	999
Other Field Crops	0	130	217	842	1,264	1,981	60	40	40	362
Truck Crops										
Potatoes	19,224	15,728	19,808	13,356	16,111	16,423	19,788	14,800	14,630	16,150
Other Truck Crops	16,701	12,660	13,692	15,521	14,504	14,624	15,580	17,651	17,575	17,125
Grain & Hay Crops	6,551	6,015	6,791	11,060	10,096	8,992	7,228	11,423	10,947	9,786
Pasture	2,010	2,252	2,142	2,552	2,394	1,825	1,484	2,517	2,113	1,973
Vineyards	26,913	27,928	28,447	29,784	29,783	29,886	30,081	29,071	28,686	29,566
Deciduous Orchard	11,515	11,786	11,799	11,799	10,339	10,812	10,705	9,410	9,075	9,800
Citrus	12,504	13,223	13,477	14,416	14,186	14,274	14,172	14,462	14,545	14,381
Subtotal	111,307	103,106	104,846	106,361	105,906	107,851	105,447	105,078	103,417	103,240
Fallow *(4)	5,062	11,151	4,384	7,226	7,622	5,496	7,764	7,944	9,242	8,362
Total Irrigated Acres	116,369	114,257	109,230	113,587	113,528	113,347	113,211	113,022	112,659	111,602
Semi-Incidental To Agricultural										
Urban	1,697	1,955	1,791	1,126	1,326	1,474	1,474	1,474	1,930	610
Non-Irrigated Crops	6,626	7,745	9,503	7,260	7,119	7,153	7,153	7,183	6,996	9,713
Abandoned Orchards/Vineyards	2,972	586	4,738	1,172	652	507	671	570	502	219
Idle Land *(5)	0	77	26	26	26	26	27	681	251	251
Native Classes	66	284	256	316	226	319	333	671	1,558	2,094
Total Non-Irrigated Acres	3,930	6,756	6,116	8,173	8,783	8,834	8,791	8,059	7,764	7,171
Total District Acreage	15,291	17,403	22,430	18,073	18,132	18,313	18,449	18,638	19,001	20,058
Total District Acreage	131,660	131,660	131,660	131,660	131,660	131,660	131,660	131,660	131,660	131,660

*(1) Standard Land Use Legend as prepared by DWR, July 1993

*(2) Land Use is surveyed during the Spring of each year

*(3) Land Use survey completed in July

*(4) Land is tilled at time of survey but current crop not identified

Groundwater overdraft prior to the introduction of Central Valley Project water was estimated to be 200,000 acre-feet per year, until pumping lifts exceeded 600 feet in many areas of the District. Further, the receding water table in certain areas had induced the subsurface movement of water with high boron concentrations from the bedrock complex bordering the District to the east into the pumped aquifers underlying the area.

IMPORTED WATER SUPPLY

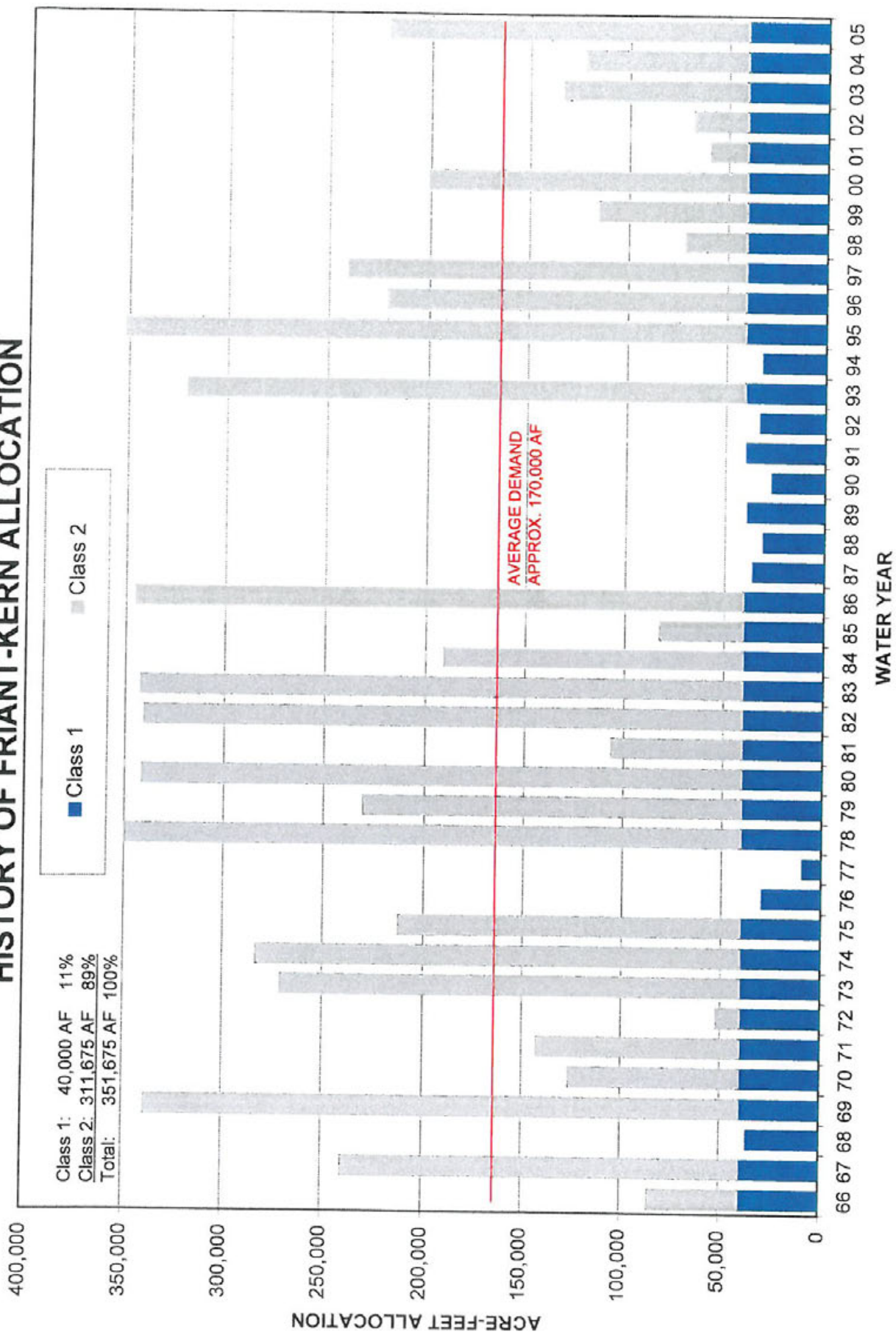
Water for the District's project is obtained primarily from the Friant-Kern Division of the Federal Central Valley Project. The District's water service contract with the United States provides for delivery of 40,000 acre-feet per year of Class 1, or firm water; and up to 311,675 acre-feet per year of Class 2, or nonfirm water. Over the long-term, the District's annual Friant-Kern Canal water entitlement has ranged from a minimum of about 10,000 acre-feet in a very dry year such as 1977, to a maximum of 351,675 in very wet years such as 1978 and 1995 (Figure 2).

Since the District's water supply varies widely from year to year, providing for a firm surface water supply for lands to be served within the District requires that both cyclic and seasonal regulation be provided within the District. This regulation is obtained, in part, by use of the groundwater reservoir underlying the District.

In an effort to further reduce the effects of the erratic nature of its water supply, Arvin-Edison entered into a Memorandum of Understanding, which provides for the exchange of a portion of its Friant-Kern Canal water supply for a federal water supply to be delivered to Arvin-Edison through the California Aqueduct and the Cross Valley Canal. This exchange program, which is depicted in Figure 3, is known as the Cross Valley Canal Exchange. Under terms of the Exchange, Arvin-Edison annually would receive up to 66,096 acre-feet of water from the Cross Valley Canal Exchangors, delivered on an irrigation demand schedule in return for delivery of up to 70,984 acre-feet per year of its Class 1 and Class 2 supply to six Exchangor agencies located

FIGURE 2

ARVIN-EDISON WATER STORAGE DISTRICT HISTORY OF FRIANT-KERN ALLOCATION



along the Friant-Kern Canal on the east side of the San Joaquin Valley. The District's Friant-Kern Canal supply to be delivered to the Exchangors will vary from year to year, but should average 66,096 acre-feet per year over the long term. Due to the termination of a portion of the exchange in 1995 by two districts, the size of the exchange has been reduced from its previous size of a 128,300 AF maximum return and a 174,300 AF maximum delivery to eight exchangors.

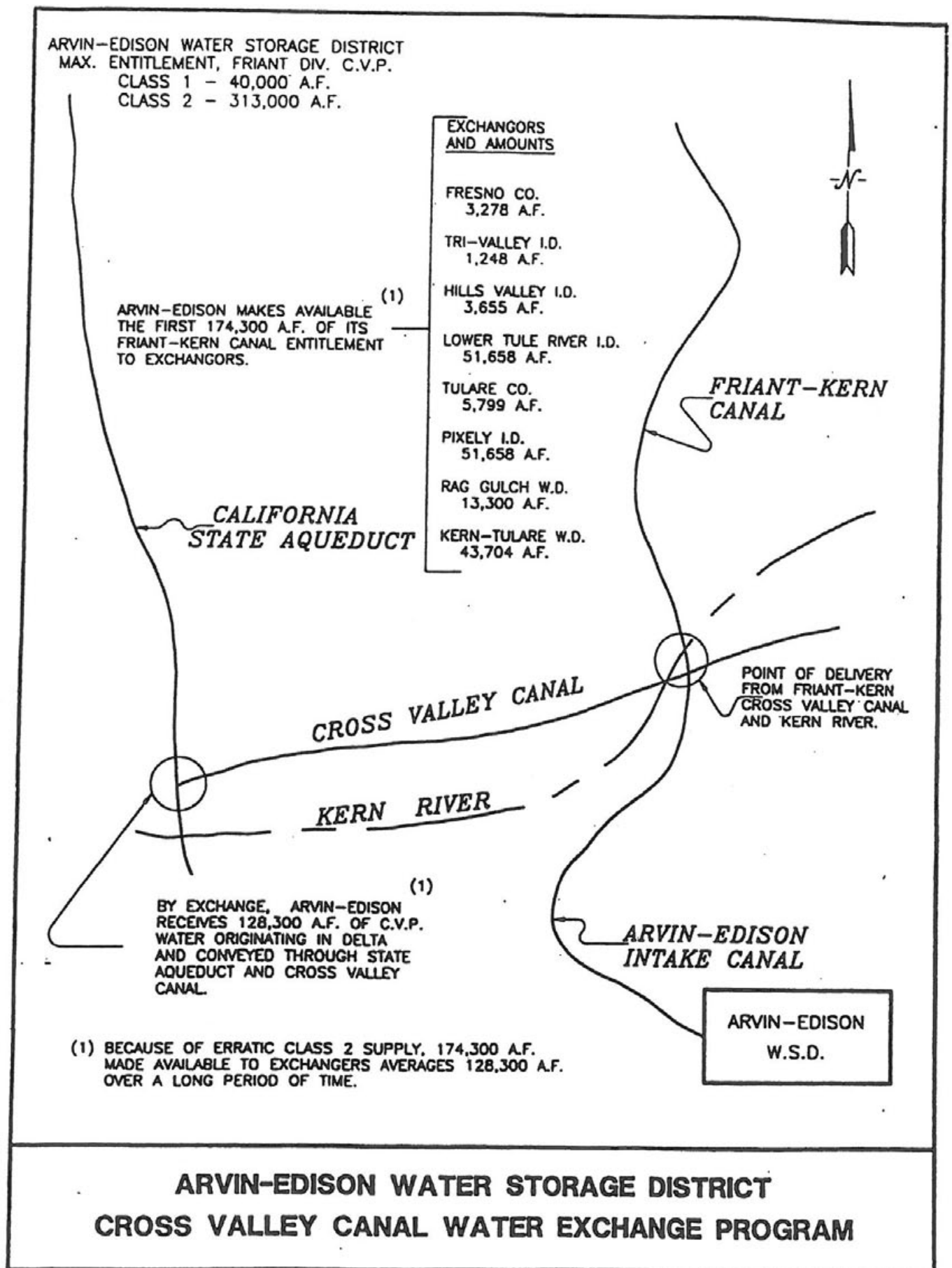
CONCEPT OF PROJECT OPERATIONS

The conceptual plan of the Arvin-Edison project includes the use of surface water and groundwater storage to regulate an erratic water supply to an irrigation demand schedule. Through service of this regulated water supply to about 40 percent of the land in the District formerly irrigated with groundwater, groundwater overdraft is being relieved and the remaining lands continue to be irrigated from a stabilized groundwater source. Factors of economies of distribution system construction and the financial burden of operating a dual system to serve individual farms, as well as the desirability of introducing surface water in specified portions of the District with groundwater of greater depths and/or poor quality, dictated that full water service be provided to a portion of the lands rather than partial service to all lands.

To the extent there is a coincident demand, water conveyed to Arvin-Edison via the Friant-Kern and Cross Valley Canals is delivered directly for irrigation through the District's distribution system. Water in excess of this coincident irrigation demand is percolated to underground storage in District-operated spreading works. The spreading works are described in more detail later in this outline.

When water from the surface supplies are insufficient to meet demands of the District's Surface Water Service Area, water previously banked in underground storage by the District is recovered through District wells and delivered into the system to meet this deficiency. The program is diagrammed in Figure 4.

FIGURE 3



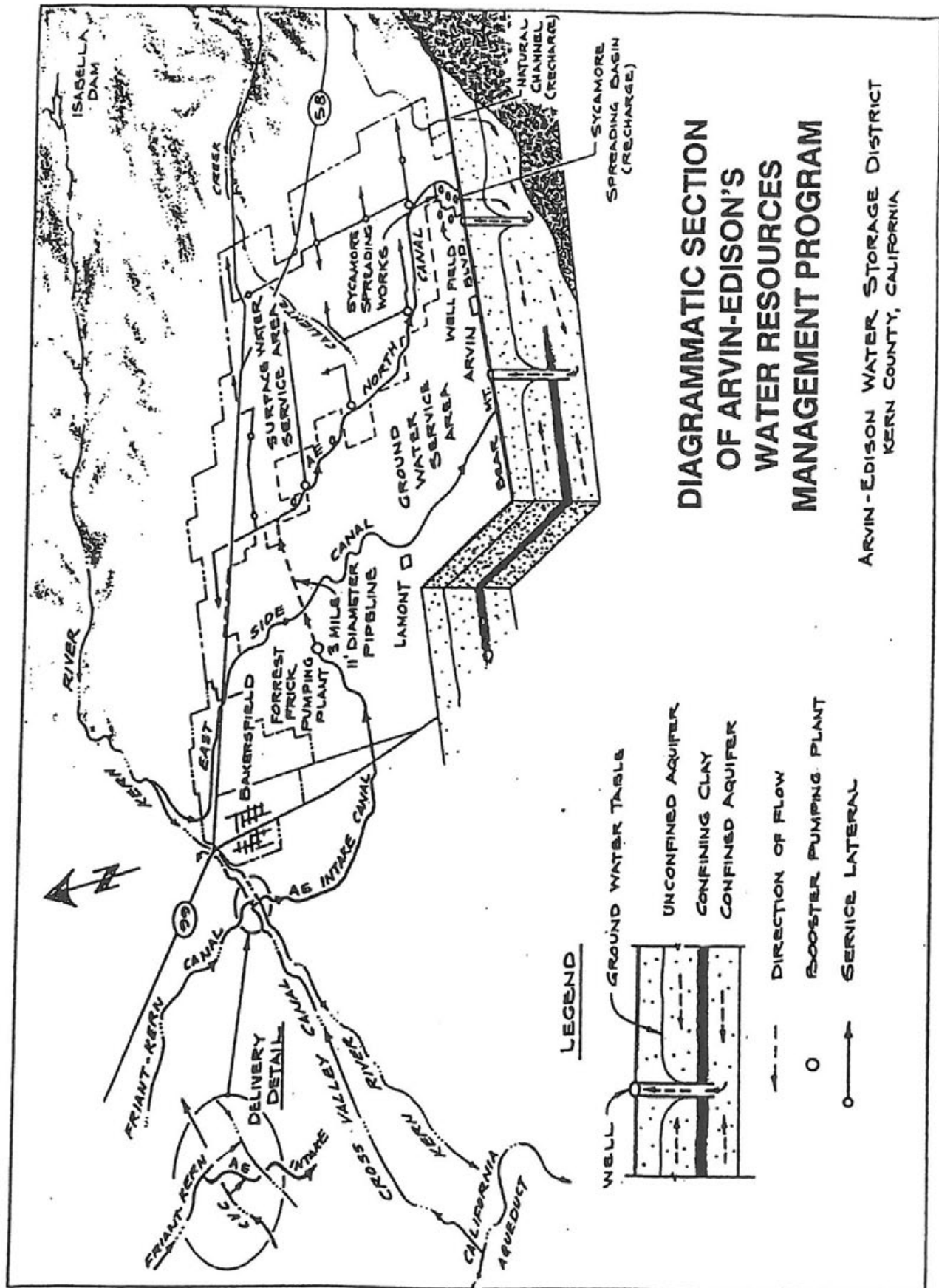
Over the long term, over 1,000,000 acre-feet of underground storage capacity will be utilized to regulate the District's water supply. Geologic studies show that there is in excess of this volume of de-watered storage capacity available for this purpose.

WATER SERVICE CHARGES

Surface water service is provided to water users under terms of individual water user contracts executed by the District and its water users. The charges for surface water service consist of two components: A Water Standby Charge and a Water Use Charge. Starting in the Water Year 2006, the structure of the water service charges has been modified. The Water Standby Charge is a per acre charge and is the minimum due the District regardless of the quantity of water used. Water use charges are fully creditable towards the water standby charge. The Water Use Charge consists of a water component and an energy component. The energy component is a variable amount per acre-foot based upon the number of pumping lifts required to convey the water to the water user and is intended to recapture District power costs associated with the delivery of water. The water component of the Water Use Charge provides for a portion of the cost of the water. The total of the average water costs and the energy costs to surface water users approximates the average variable cost (PG&E energy cost) of pumping groundwater within the District. The Water Standby Charge for the 2006 Water Year is \$100.00 per acre, but in virtually all cases, water use charges reduce the effective rate to zero. The energy component of the Water Use Charge is \$33.00 for the first lift plus \$18.00 per subsequent lift per acre-foot, and the water component is \$44.00 per acre-foot. This results in an average composite Water Use Charge of approximately \$118.44 per acre-foot. The water service charges are set annually by the District's Board of Directors, and a history of water charges is shown in Figures 5 and 6.

In addition to long term water service, the Arvin-Edison Board of Directors has established a policy by which temporary water service is made available to lands outside the Service Area during those periods when the District is percolating water to underground storage.

FIGURE 4



Revenue to pay Project financial obligations is raised from water tolls as outlined above; and from General Administrative (GA) and General Project Service (GP) Charges levied on benefited lands within the District. The General Administrative and General Project Service Charges were initially levied by Board action for the 1973-74 Fiscal Year at the rate of \$6.65 per acre and a flat charge of \$3.00 per parcel for sub-acre parcels. By this means, all irrigated lands have contributed financially toward Project benefits. The same service charges for the 2006 Fiscal/Water Year are projected to be \$54.00 per acre and a flat charge of \$10.40 per parcel for sub-acre parcels. Collection of the charges was suspended in the 1982-83 and 1983-84 Fiscal Years, but reinstituted in the 1984-85 Fiscal Year, and collection remains in force at present.

PROJECT FACILITIES

The principal elements of the Arvin-Edison project were constructed during the period 1964 through 1968. The project, financed under Public Law 130, was administered by the Bureau of Reclamation and the United States Department of the Interior. The assistance and continued cooperation of the Bureau of Reclamation have contributed greatly in bringing this project to reality. The loan contract between the United States and the District provided for a 40-year repayment period following a maximum five-year development period, which terminated as of January 1972. Project facilities were completed for the Federal loan amount of \$41 million, plus an additional contribution by the District landowners of \$4.6 million used for the purpose of securing lands, easements, and rights-of-way. In July of 1988, the District paid off the remaining \$26 million principal balance of its PL-130 Loan, at a "discounted" payoff amount of \$9 million. \$3.4 million of the \$9 million was paid out of AEWSD reserves; and the remaining \$5.6 million was refinanced through the investment group of MNC Leasing Corp., to be repaid over a period of 7 years at a 7.5% annual rate. The refinanced annual loan payments were \$952,000 per year, and the final payment date was July 1995.

FIGURE 5

**ARVIN-EDISON WATER STORAGE DISTRICT
HISTORY OF WATER COSTS AND ASSESSMENTS**

Water Year	Water Service Charges - \$/AF			Total \$/AC	Standby \$/AC	GA & GP (\$/AC)	Total Costs	
	Power	Water	Total				(\$/AC)	(\$/AF)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1966	2.70	0.00	2.70	7.43	33.00	0.00	40.43	14.70
1967	2.70	0.00	2.70	7.43	33.00	0.00	40.43	14.70
1968	2.70	0.00	2.70	7.43	33.00	0.00	40.43	14.70
1969	2.70	0.00	2.70	7.43	33.00	0.00	40.43	14.70
1970	2.70	0.00	2.70	7.43	33.00	0.00	40.43	14.70
1971	2.70	0.00	2.70	7.43	33.00	0.00	40.43	14.70
1972	2.70	0.00	2.70	7.43	33.00	0.00	40.43	14.70
1973	2.70	0.00	2.70	7.43	33.00	6.65	47.08	17.12
1974	2.70	0.00	2.70	7.43	33.00	6.65	47.08	17.12
1975	2.70	0.00	2.70	7.43	33.00	6.65	47.08	17.12
1976	2.70	0.00	2.70	7.43	33.00	6.65	47.08	17.12
1977	2.70	0.00	2.70	7.43	33.00	6.65	47.08	17.12
1978	7.20	0.00	7.20	19.80	44.00	6.65	70.45	25.62
1979	7.20	0.00	7.20	19.80	49.50	6.65	75.95	27.62
1980	7.20	0.00	7.20	19.80	49.50	6.65	75.95	27.62
1981	7.20	0.00	7.20	19.80	68.75	6.65	95.20	34.62
1982	7.20	0.00	7.20	19.80	68.75	0.00	88.55	32.20
1983	11.00	0.00	11.00	30.25	68.75	0.00	99.00	36.00
1984	13.50	0.00	13.50	37.13	74.25	6.65	118.03	42.92
1985	18.90	0.00	18.90	51.98	90.75	6.65	149.38	54.32
1986	24.30	0.00	24.30	66.83	74.25	6.65	147.73	53.72
1987	27.00	0.00	27.00	74.25	74.25	6.65	155.15	56.42
1988	27.00	0.00	27.00	74.25	74.25	6.65	155.15	56.42
1989	27.00	0.00	27.00	74.25	79.75	6.65	160.65	58.42
1990	27.00	5.00	32.00	88.00	79.75	6.65	174.40	63.42
1991	27.00	10.00	37.00	101.75	79.75	6.65	188.15	68.42
1992	27.00	6.00	33.00	90.75	101.75	6.65	199.15	72.42
1993	24.30	12.00	36.30	99.83	110.00	17.55	227.38	82.68
1994	24.30	21.00	45.30	124.58	118.25	18.00	260.83	94.85
1995	24.30	41.00	65.30	179.58	71.00	23.00	273.58	99.48
1996	24.30	41.00	65.30	179.58	71.00	23.00	273.58	99.48
1997	24.30	41.00	65.30	179.58	71.00	23.00	273.58	99.48
1998	20.80	44.00	64.80	178.20	57.00	23.00	258.20	93.89
1999	20.80	30.00	50.80	139.70	57.00	23.00	219.70	79.89
2000	20.80	30.00	50.80	139.70	57.00	23.00	219.70	79.89
2001	20.80	30.00	50.80	139.70	48.00	10.00	197.70	71.89
2002	20.80	30.00	50.80	139.70	48.00	10.00	197.70	71.89
2003	23.40	37.00	60.40	166.10	49.00	23.00	238.10	86.58
2004	23.40	37.00	60.40	166.10	49.00	23.00	238.10	86.58
2005	42.20	30.00	72.20	198.55	32.00	23.00	253.55	92.20
2006	61.80	37.00	98.80	271.70	0.00	54.00	325.70	118.44

Shaded cells indicate estimated or proposed

NOTES: (1) MARCH THROUGH FEBRUARY

(2) POWER CHARGE BASED ON AN AVERAGE OF 2.6 LIFTS

(3) REQUIRED PURSUANT TO RECLAMATION LAW

(4) SUM OF (2) AND (3)

(5) 2.75 X (4). ASSUMES A 2.75 AF/AC WATER APPLICATION RATE

(6) FIXED CHARGE BASED ON CONTRACT ACRE-FT THROUGH 1994 (ASSUMES 2.75 AF/AC), THEN BASED ON CONTRACT \$/AC RATES FROM 1995 ON. BEGINNING IN 2006, CREDITED TOWARDS WATER USE CHARGES.

(7) ESTABLISHED IN 1973, WAIVED FOR 1982 & 1983, CONSISTS OF GENERAL ADMINISTRATIVE AND GENERAL PROJECT SERVICE CHARGES

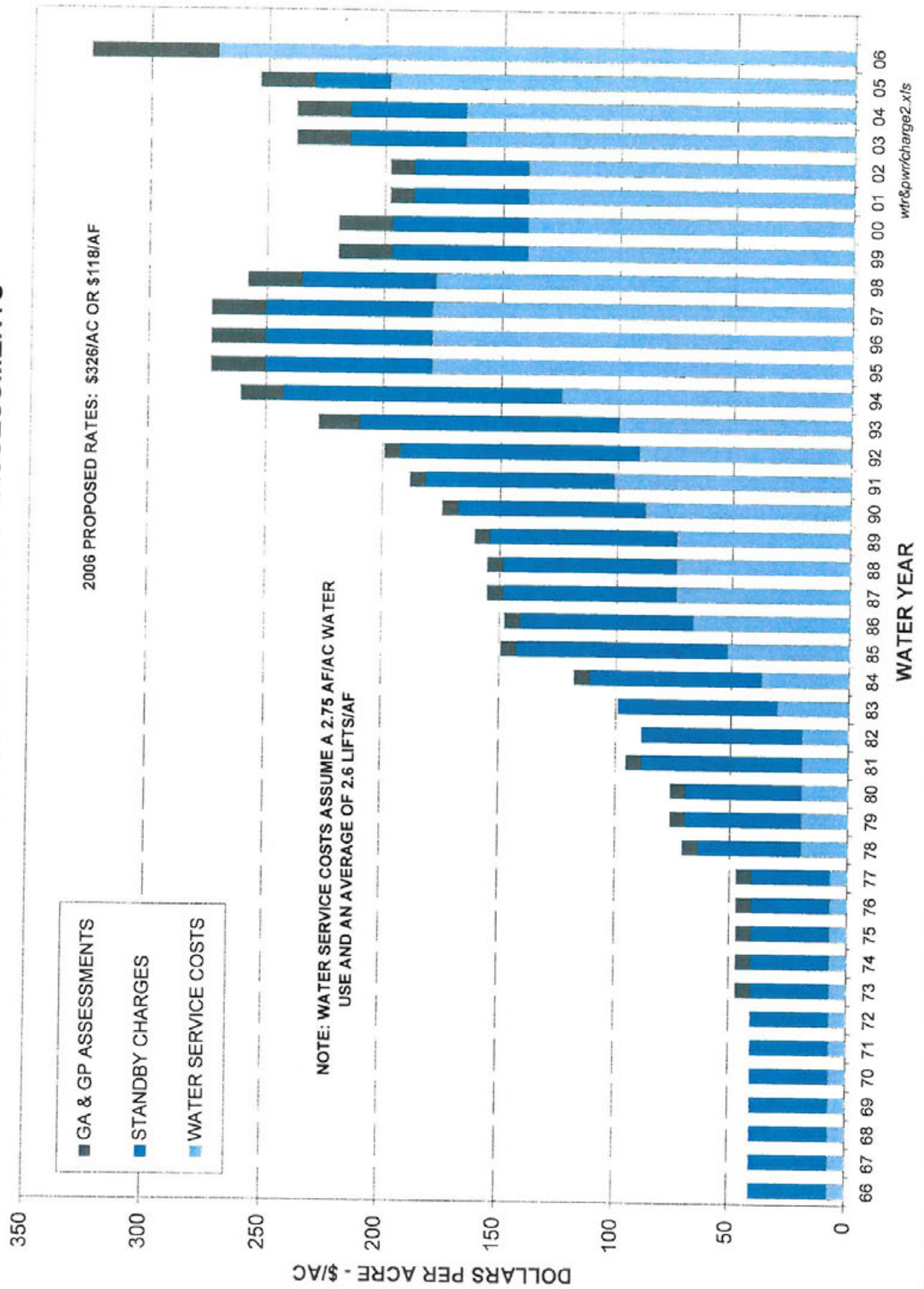
(8) (5) + (6) + (7). TOTAL PER ACRE COSTS FOR WATER SERVICE AND ASSESSMENTS

(9) (8) / 2.75 ASSUMES A 2.75 AF/AC WATER APPLICATION RATE

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FIGURE 6

ARVIN-EDISON WATER STORAGE DISTRICT HISTORY OF WATER COSTS AND ASSESSMENTS



The primary facility of the project is a 45-mile canal system, which, as shown on the attached District map, extends from the terminus of the Friant-Kern Canal, through the increasingly urbanized area of Southwest Bakersfield and through the District. This canal has a capacity in its initial 30 miles of 1,000 cubic feet per second, which rate of flow is required to accommodate maximum water deliveries as provided in the District's Federal water service contract.

Another major feature of the project is the Forrest Frick Pumping Plant, located about three miles to the west of the District's westerly boundary and about 14 miles from the terminus of the Friant-Kern Canal. This plant has a capacity of 27,500 horsepower, consisting of four pumping units rated at 5,500 horsepower each, two 2,000 horsepower units, and two smaller units rated at 1,000 and 500 horsepower. The pumps are the vertical turbine type designed to operate against a maximum total dynamic head of 190 feet and have a composite flow rate of approximately 1,000 cubic feet per second. The plant discharges water into a three-mile long, eleven-foot diameter pipeline, which is constructed of pre-stressed reinforced concrete.

Other facilities in the system include about 170 miles of pressure pipeline varying in diameter from 6 to 60 inches, and 45 booster pumping plants having a total approximately 25,000 horsepower, and 510 farm turnouts.

From an operational standpoint, two key facilities are the spreading works and the associated well fields through which water is stored in the underground and later recovered when required through District wells.

Spreading Works - A program of investigation and analysis was conducted by the District's engineering consultants prior to final design to determine the most favorable location and the area needed for the spreading basins. The Sycamore Spreading Works comprises a total area of 569 acres and is located on the alluvial fan of Sycamore Creek near the middle of the District. The Tejon Spreading Works is located on the Tejon Creek alluvial fan approximately

six miles south of the Sycamore Spreading Works and covers an area of 516 acres. In Water Year 2000, the construction of the North Canal Spreading Works was completed. Located approximately four miles northwest of District Headquarters, this facility covers 348 acres. All three facilities are shown in the attached map of the District.

Diversion of water into the spreading ponds is accomplished by gravity flow from the Arvin-Edison Canal through turnout structures equipped with manually operated slide gates. A portion of the Tejon Spreading Works comprising about 260 acres is located upslope from the Arvin-Edison Canal, requiring a 65-foot maximum pumping lift. Because electrical energy is required, the Tejon Pumping Plant is operated only when the availability of water exceeds the capacity of the Sycamore Spreading Works and the gravity portion of the Tejon Spreading Works. The Tejon Pumping Plant has fourteen 200 horsepower, electrically driven pumps, which have a capability of delivering a total of 280 cubic feet per second. The North Canal Spreading Works also consists of a pumped area and a gravity area. Two 100 hp electrically driven pumps with a combined capacity of 40 cfs serve approximately 114 net acres, with the remaining 186 acres served by gravity through a 60" diameter reinforced concrete pipeline.

The principal operating difficulty experienced to date has been maintaining the spreading basin infiltration rates over prolonged periods of spreading. One factor, which contributes heavily to these difficulties, is that water delivered from the Cross Valley and Friant-Kern Canals occasionally contains silt concentrations, which exceed acceptable levels for spreading. Methods employed to maintain or restore infiltration rates include: (1) periodic drying of surface soils; (2) promotion of grass growth on pond surfaces; (3) termination of spreading operations when total suspended solids in the imported water exceeds 25 parts per million; (4) restriction of vehicular travel within basins; (5) scarification of surface soils by chiseling or discing; and (6) removal of silt accumulations by mechanical means.

Well Fields - The North Canal, Sycamore, and Tejon Well Fields are associated with the

previously described spreading works and include 72 wells. Energy to operate the wells is supplied through District-operated 12 kv power distribution facilities.

District wells are of the rotary, gravel envelope type of construction. Each well is equipped with 16-inch diameter casing, a 6 or 7-stage pump bowl assembly and a 300 to 400 hp electrically powered motor. The wells range in depth from 750 to 1,078 feet with pump bowl settings varying from 450 to 600 feet. The individual pumping units are designed to produce approximately 4 cfs at a total pumping head of approximately 450 feet.

The North Canal Spreading Works is comprised of 9 wells, all of which are located within the facility boundaries. The Sycamore Well Field is comprised of a total of 33 wells, 26 of which are located within the spreading works, and the remainder being located west of and adjacent to the Sycamore Spreading Works. The Tejon Well Field consists of 25 wells, 20 of which are located within the spreading works area, and 5 are located outside the peripheral dikes. In addition to the 67 wells included in the North Canal Spreading Works, Sycamore, and Tejon Fields, 5 wells of similar design are located along the Arvin-Edison Canal in the northern area of the District bringing the total number of District wells to 72.

PROJECT ACCOMPLISHMENTS

Project operations commenced in July 1966, with the first diversions of water to the Sycamore Spreading Works. Since that time, nearly 6.0 million acre-feet of water has been imported by the District. At the end of the 2005 Water Year, nearly 1.8 million acre-feet of water had been percolated to the underground and over 5.0 million acre-feet had been delivered directly to surface water users.

No significant groundwater extractions were made by the District prior to 1968. Beginning in March 1968, it became necessary to operate District wells for the first time to supplement the available surface water supply. Figures 7 and 8 reflect the history of percolation and extractions from the District's spreading and water recovery facilities.

Groundwater level fluctuations in an observation well located approximately one-quarter mile north of Sycamore Spreading Works are illustrated in Figure 9. Heavy extractions of groundwater were required to maintain firm water service during the 1972, 1976, 1977, 1987-92, 1994 and 2004 Water Years, during which the District's imported water supply was severely reduced. Such extractions were responsible for the sharp draw-down in water levels indicated to have occurred during those years.

As a result of the accumulation of nearly 500,000 acre-feet of water in groundwater storage achieved by the end of the 1980 Water Year, and the availability of additional quantities of firm water as a result of the Cross Valley Canal Exchange, the District increased its annual firm water service commitment to approximately 160,300 acre-feet.

The estimated net percolation (i.e., diversions to spreading less evaporation), ground water extraction, accumulation of groundwater storage and direct delivery of imported surface water which have occurred since 1966 are summarized by water year in Figure 7.

Stabilization of Groundwater Levels - The effect of District operations, which were initiated in July 1966, is reflected by a general stabilization of groundwater levels, as graphically illustrated in Figure 10. The water level decline shown to have occurred during the pre-project period represents a continuation of the average annual long-term decline in groundwater levels of 7 to 8.5 feet per year throughout most of the District. Under non-project conditions, it is estimated that by the end of the 2005 Pumping Season average groundwater levels in the Arvin-Edison area would have exceeded 600 feet. A review of project versus non-project conditions is presented in Figure 10 and a hydrologic inventory in Figure 11.

The effect of the project operations has been to provide a firm surface water supply to a large number of irrigators whose well supply was failing or who were pumping groundwater of unsatisfactory quality. In addition, the importation of a substantial quantity of surface water since the inception of District operations has resulted in a reduction in subsurface inflow from

neighboring areas and a significant improvement in both groundwater depths and water quality for those irrigators in the District who continue to rely on groundwater.

ARVIN-EDISON / METROPOLITAN WATER MANAGEMENT PROGRAM

In December 1997, the District entered into a 25-year agreement with the Metropolitan Water District of Southern California (MWD), in which the District agreed to bank approximately 250,000 AF of MWD State Water Project Supply and return said water in certain drought years. Said water will be returned during off-peak times so as not to interfere with normal, historic District operations. In order to accomplish this program, nearly \$25 million in new facilities are under construction, which includes 550 acres of new spreading, 15 new groundwater wells, and 4½ mile, bi-directional intertie pipeline connecting the terminus of the District's south canal with the California Aqueduct, construction of which was completed in 2002. The District will utilize the new facilities to firm up its own water supplies as well as for effecting banking programs for others. Funding for the new construction is accomplished by the collection of water management fees as water is banked for and returned to MWD. With construction generally completed, the District now is able to utilize a total of 72 groundwater wells and close to 1,500 acres of spreadingbasins

FIGURE 7

ARVIN-EDISON WATER STORAGE DISTRICT
PROJECT OPERATIONS SUMMARY - 1966 TO 2005

(Values in acre-feet)

Water Year	Imported Water Supply	Deliveries to Water Users	Underground Storage						Banking Return	Losses and Metering Inaccuracy
			Gross Spreading	Evaporation	Net Percolation	Extractions	Change	Cumulative		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1966	39,008	0	42,137	735	41,402	0	41,402	41,402	0	-3,129
1967	83,851	17,867	64,903	1,239	63,664	0	63,664	105,066	0	1,081
1968	61,015	63,940	5,550	93	5,457	11,374	-5,917	99,149	0	2,899
1969	199,996	95,251	110,844	3,016	107,828	447	107,381	206,530	0	-5,652
1970	131,764	104,210	28,565	572	27,993	85	27,908	234,438	0	-926
1971	146,753	100,625	45,425	1,208	44,217	32	44,185	278,623	0	735
1972	53,420	104,626	309	3	306	52,659	-52,353	226,270	0	1,144
1973	181,590	119,128	65,824	2,018	63,806	769	63,037	289,307	0	-2,593
1974	199,845	133,996	66,121	1,885	64,236	1,725	62,511	351,818	0	1,453
1975	202,664	138,599	69,557	1,928	67,629	3,642	63,987	415,805	0	-1,850
1976	108,777	148,374	5,290	45	5,245	49,875	-44,630	371,175	0	4,988
1977	31,563	107,067	0	0	0	81,979	-81,979	289,196	0	6,475
1978	182,916	123,040	62,603	1,959	60,644	2,922	57,722	346,918	0	195
1979	225,942	148,438	74,613	1,815	72,798	308	72,490	419,408	0	3,199
1980	224,093	154,104	76,532	2,219	74,313	27	74,286	493,694	0	-6,516
1981	172,139	152,673	20,649	432	20,217	14,599	5,618	499,312	0	13,416
1982	234,004	137,517	90,150	2,794	87,356	12	87,344	586,656	0	6,349
1983	182,325	135,762	50,038	2,154	47,884	6,560	41,324	627,980	0	3,085
1984	166,632	148,175	16,428	347	16,081	9,321	6,760	634,740	0	11,350
1985	158,211	141,865	10,156	263	9,893	11,892	-1,999	632,741	0	18,082
1986	214,124	139,176	73,268	3,174	70,094	5,660	64,434	697,175	0	7,340
1987	125,964	140,339	2,156	149	2,007	24,332	-22,325	674,850	0	7,801
1988	114,157	139,541	2,907	152	2,755	33,742	-30,987	643,863	0	5,451
1989	119,680	148,095	6,066	159	5,907	36,278	-30,371	613,492	0	1,797
1990	60,242	149,969	2,403	62	2,341	99,152	-96,811	516,681	0	7,022
1991	36,795	113,312	173	3	170	80,544	-80,374	436,307	0	3,854
1992	66,042	132,682	9,469	216	9,253	84,483	-75,230	361,077	0	8,374
1993	260,847	130,681	122,917	2,516	120,401	6,595	113,806	474,883	0	13,844
1994	89,802	137,277	13,031	192	12,839	75,279	-62,440	412,443	0	14,773
1995	282,567	135,481	112,971	3,745	109,226	1,095	108,131	520,574	0	35,210
1996	231,831	147,303	57,539	3,433	54,106	0	54,106	574,680	0	26,989
1997	258,232	149,338	73,403	2,409	70,994	0	70,994	645,674	0	35,491
1998	213,197	114,123	82,360	4,904	77,456	681	76,775	722,449	0	17,395
1999	251,342	151,376	87,179	6,639	80,540	1,049	79,491	801,940	0	13,836
2000	257,207	143,549	101,950	4,552	97,398	5,427	91,971	893,911	0	17,135
2001	47,206	153,343	2,737	180	2,557	117,608	-115,051	778,860	0	8,734
2002	99,001	148,054	9,090	326	8,764	80,519	-71,755	707,105	11,483	10,893
2003	171,215	132,943	43,180	1,408	41,772	16,650	25,122	732,227	897	10,845
2004	108,504	143,662	31,669	265	31,404	100,125	-68,721	663,506	25,512	7,786
2005	253,445	139,033	105,723	3,917	101,806	174	101,632	765,138	0	8,863
	6,247,908	5,064,534	1,845,885	63,126	1,782,759	1,017,621	765,138		37,892	317,218

NOTES:

- (1) Water Year - March through February of the following year.
 (2) Total imported supply - all sources
 (3) Metered deliveries to turnouts
 (4) Measured deliveries to spreading basins
 (5) Calculated from wetted area and measured pan evaporation
 (6) Col 4 - Col 5

- (7) Metered wellfield production plus farm wells
 (8) Col 6 - Col 7
 (9) Accumulated Col 7
 (10) Exports from banking programs.
 (11) Col 2 + Col 7 - Col 3 - Col 4 - Col 10

2/17/2007

ARVIN-EDISON WATER STORAGE DISTRICT ACCUMULATION OF UNDERGROUND STORAGE

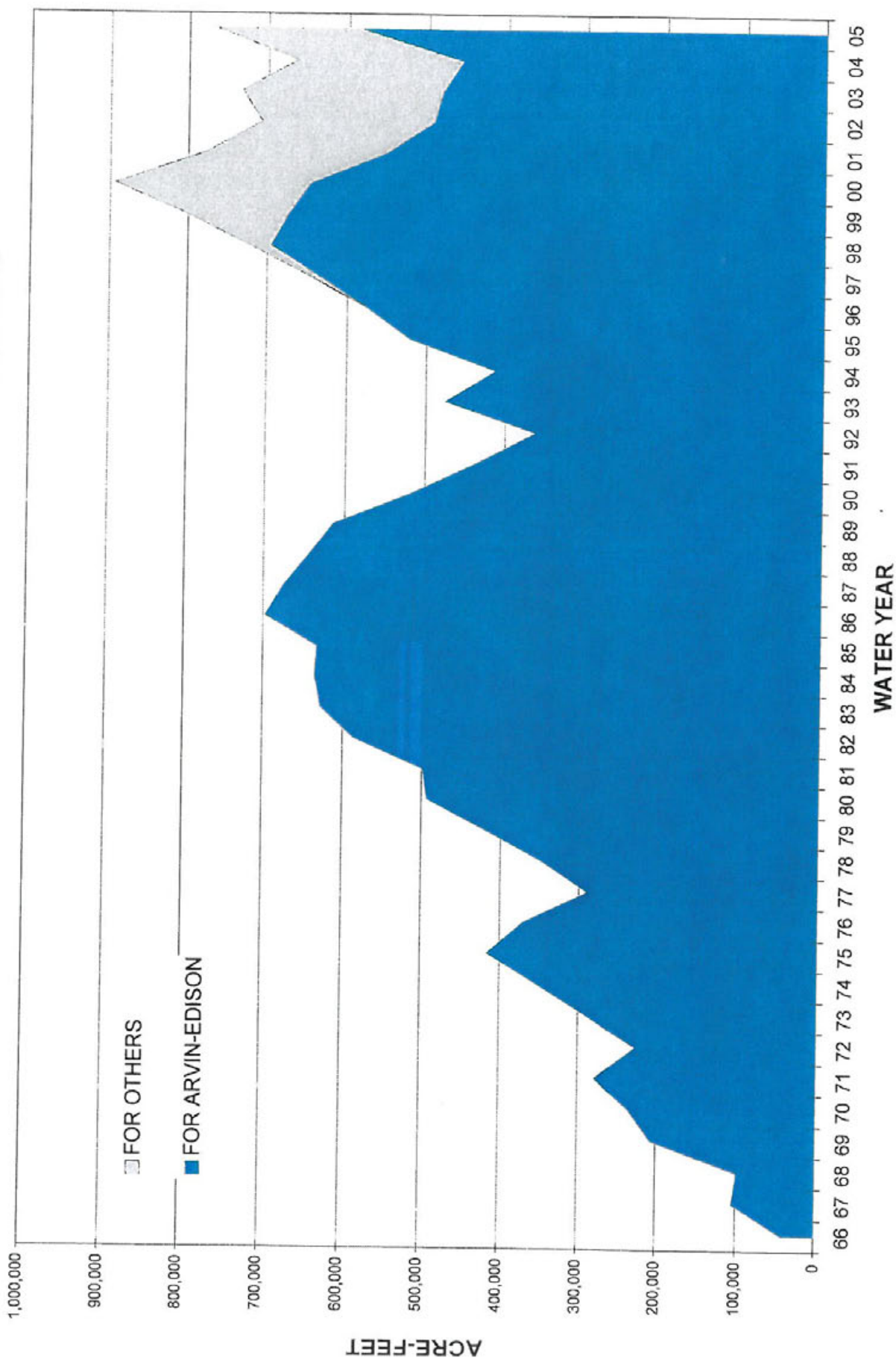
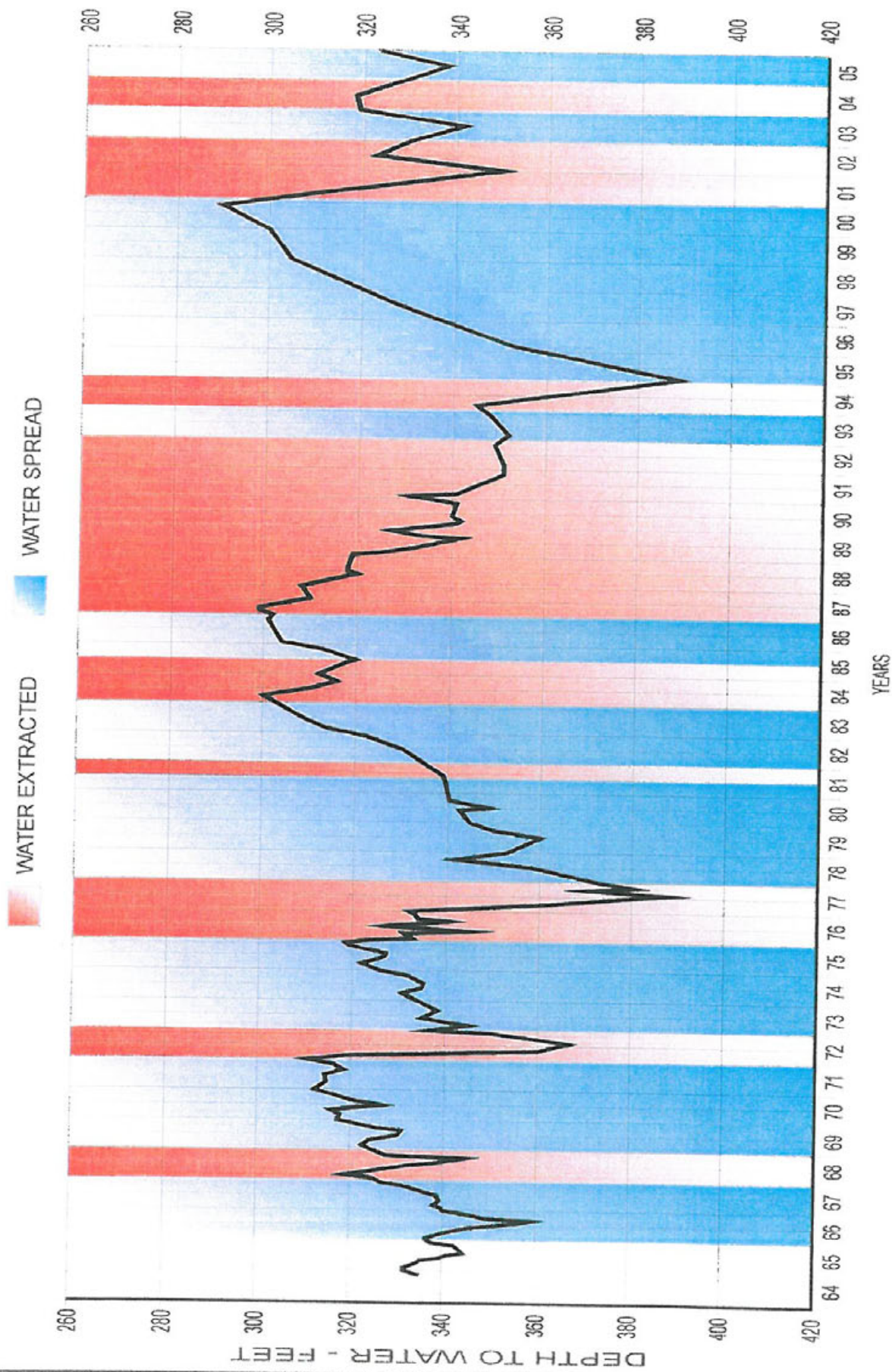


FIGURE 8

FIGURE 9



HYDROGRAPH OF WATER LEVEL FLUCTUATIONS
IN AN OBSERVATION WELL NEAR SYCAMORE SPREADING WORKS

SUMMARY

The Arvin-Edison Water Storage District is operating a project which embodies the somewhat unique concept of managing an erratic surface water supply in conjunction with existing groundwater reserves through the utilization of underground storage. In so doing the District has been able to provide firm water service to its surface water users while stabilizing groundwater supplies for those of its landowners who continue to depend upon the underground source. The project concept and facilities have now been successfully tested over a period of time, which has included years of both maximum and minimum imported water supplies. Achievement of full firm water service of about 180,000 acre-feet per year for the 52,000-acre Surface Water Service Area depends upon the year-by-year magnitude of imported water supplies under the District's Federal water service and exchange agreements as well as the acceptability of that water for spreading. Therefore, the occurrence of future wet years may enable additional increases in firm water service and will be another step forward in achieving the objectives of the project.

FIGURE 10

Arvin-Edison Water Storage District

Average Static Groundwater Depth in District

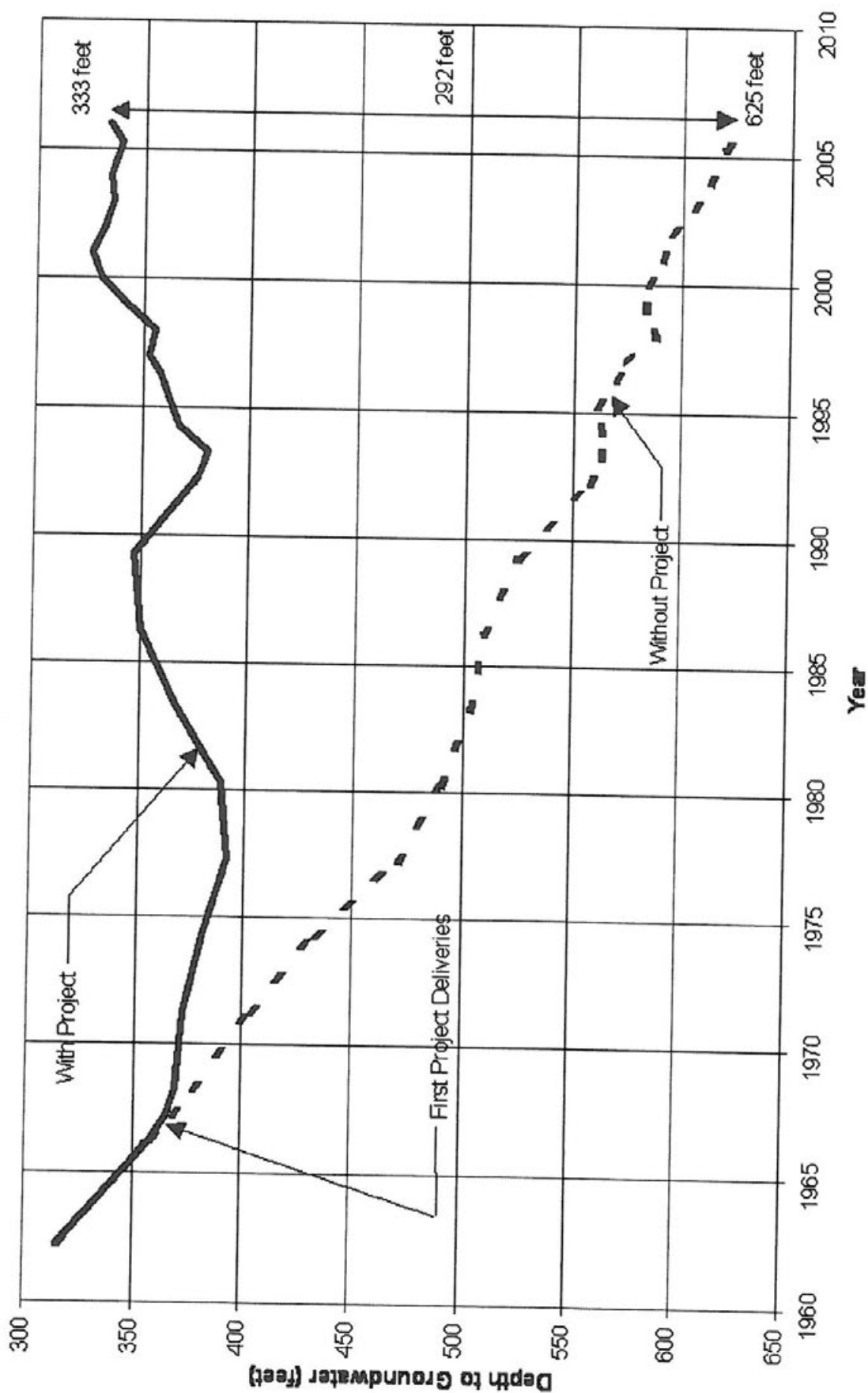
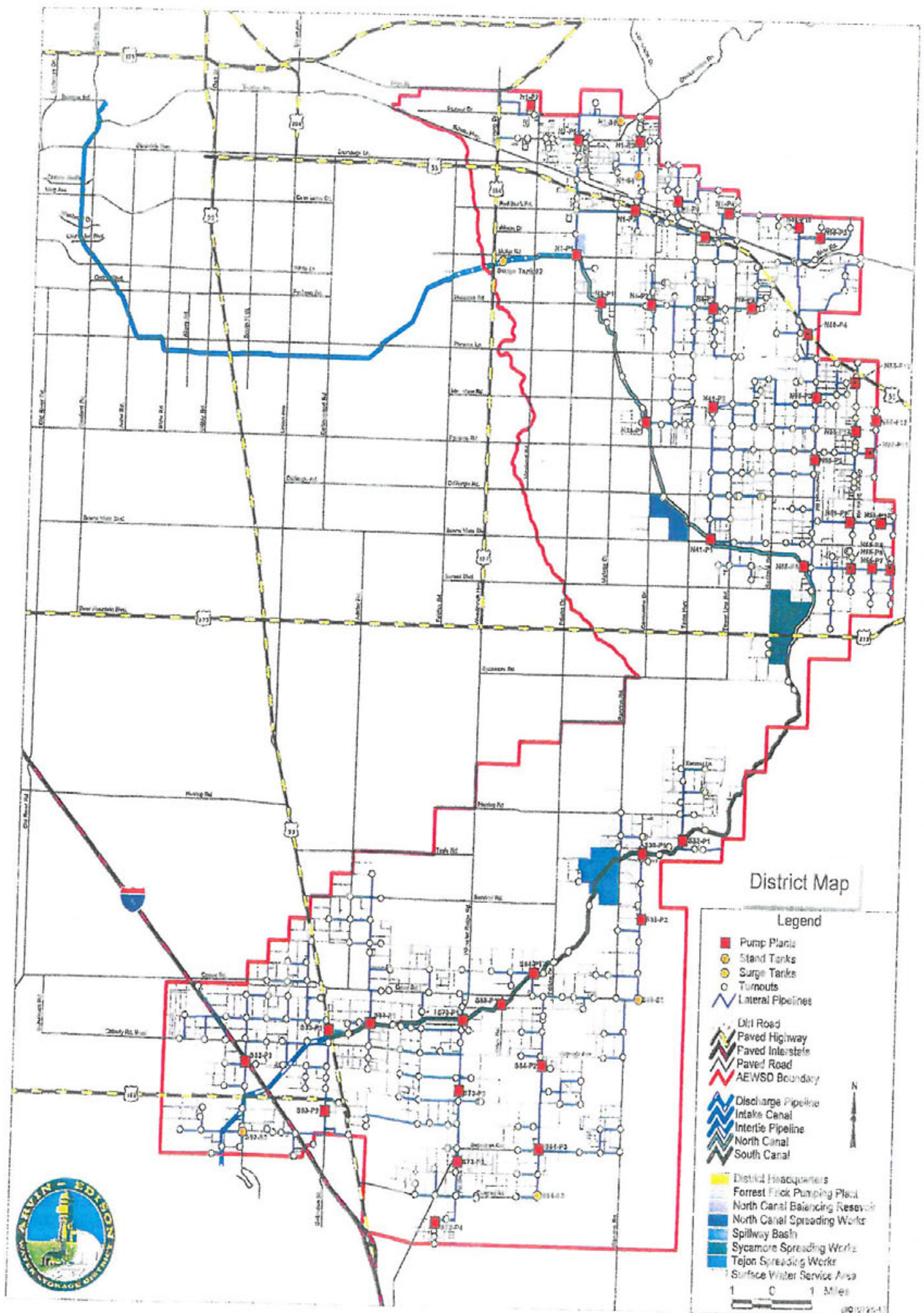


FIGURE 11

Attachment 2
Hydrologic Inventory for Arvin Edison Water Storage District

ITEMS OF SUPPLY	PROJECT (acre-feet per year)	NON-PROJECT
Effective Precipitation	18,000	18,000
Surface Inflow	22,000	22,000
Subsurface Inflow	60,000	104,000
Import	161,000	0
Sub-total	261,000	144,000
ITEMS OF DISPOSAL		
Surface Outflow	4,000	4,000
Evaporation	1,000	1,000
Consumptive Use	265,000	265,000
Sub-total	270,000	270,000
SUPPLY MINUS DISPOSAL	-9,000	-126,000
AVERAGE ANNUAL CHANGE IN GROUNDWATER LEVEL	-0.3 feet	-7.3 feet

(1) From 1966-1967 water year to 2004-2005 water year



ATTACHMENT

I

EXHIBIT "C-1"

ARVIN-EDISON WATER STORAGE DISTRICT CANAL WATER QUALITY SUMMARY

Date	Flow cfs	Source	Calcium		Magnesium		Sodium		Bicarbonate		Chloride		TDS mg/l	pH	EC umhos/cm	Hardness		SAR	Gypsum lbs/AF	Boron mg/l
			mg/l	me/l	mg/l	me/l	mg/l	me/l	mg/l	me/l	mg/l	me/l								
Intake Canal	06/15/05	F-K	2.1	0.11	0.4	0.03	2.1	0.09	14	0.45	0.7	0.02	13	7.3	24	7	0.3	21	<0.10	
	05/12/05	F-K	3.6	0.18	0.7	0.06	3.4	0.15	24	0.76	1.6	0.04	23	7.4	39	12	0.4	36	<0.10	
	04/21/05	F-K	4.0	0.20	7.8	0.64	4.0	0.17	25	0.80	1.9	0.05	25	7.5	49	13	0.5	35	<0.10	
	03/25/05	F-K	4.0	0.20	0.8	0.07	4.5	0.19	24	0.76	2.4	0.07	24	7.5	43	13	0.5	30	<0.10	
	02/16/05	F-K	3.4	0.17	0.6	0.05	3.2	0.14	22	0.70	2.3	0.06	22	7.5	43	11	0.4	33	<0.10	
	01/28/05	F-K	3.8	0.19	0.7	0.06	3.6	0.16	20	0.64	2.3	0.06	23	7.4	45	12	0.5	22	<0.10	
	12/20/04	F-K/CVC	16.0	0.80	5.9	0.48	30.0	1.29	53	1.69	38.0	1.07	146	8.4	278	64	1.7	0	<0.10	
	Average		5.3	0.3	2.4	0.2	7.3	0.3	26.0	0.8	7.0	0.2	39.4	7.6	74.4	18.9	0.6	25.3	0.06	
North Canal	06/15/05	F-K	2.1	0.11	0.4	0.03	2.1	0.09	16	0.51	0.8	0.02	15	7.3	24	7	0.4	30	<0.10	
	05/12/05	F-K	3.7	0.19	0.7	0.06	3.5	0.15	23	0.73	1.7	0.05	23	7.4	40	12	0.4	32	<0.10	
	04/21/05	F-K	4.1	0.21	0.8	0.07	4.3	0.19	28	0.89	2.0	0.06	27	7.5	46	14	0.5	45	<0.10	
	03/25/05	F-K	4.0	0.20	1.0	0.08	5.1	0.22	23	0.73	2.4	0.07	24	7.5	48	14	0.6	21	<0.10	
	02/16/05	F-K	3.5	0.18	0.6	0.05	3.1	0.13	27	0.86	2.2	0.06	24	7.5	45	11	0.4	49	<0.10	
	01/28/05	F-K	3.7	0.19	0.6	0.05	3.4	0.15	19	0.61	2.2	0.06	23	7.5	44	12	0.4	16	<0.10	
	12/20/04	F-K/CVC	17.0	0.85	5.5	0.45	34.0	1.47	85	2.71	27.0	0.76	158	8.4	296	64	1.9	81	0.20	
	Average		5.4	0.3	1.4	0.1	7.9	0.3	31.6	1.0	5.5	0.2	51	7.6	77.6	19.1	0.7	39.0	0.10	
South Canal	06/15/05	F-K	2.3	0.12	0.5	0.04	2.3	0.10	18	0.57	0.7	0.02	16	7.4	24	8	0.4	31	<0.10	
	05/12/05	F-K	3.6	0.18	0.7	0.06	3.4	0.15	20	0.64	1.5	0.04	21	7.4	41	12	0.4	22	<0.10	
	04/21/05	F-K	4.4	0.22	0.9	0.07	4.9	0.21	29	0.92	2.0	0.06	29	7.5	48	14	0.6	43	0.10	
	03/25/05	F-K	4.1	0.21	0.8	0.07	4.5	0.19	24	0.76	2.4	0.07	24	7.6	49	14	0.5	28	<0.10	
	02/16/05	F-K	3.6	0.18	0.6	0.05	3.1	0.13	23	0.73	2.2	0.06	22	7.6	43	11	0.4	43	<0.10	
	01/28/05	F-K	4.0	0.20	0.7	0.06	3.4	0.15	21	0.67	2.2	0.06	23	7.5	46	13	0.4	22	<0.10	
	12/20/04	F-K/CVC	21.0	1.05	6.9	0.57	36.0	1.55	100	3.18	24.0	0.67	176	8.5	317	80	1.8	81	0.20	
	Average		6.1	0.3	1.6	0.1	8.2	0.4	33.6	1.1	5.0	0.1	44.4	7.6	81.1	21.7	0.6	38.6	0.10	
Intertie Pipeline	12/20/04	F-K/CVC	21.0	1.05	7.2	0.59	35.0	1.51	100	3.18	25.0	0.70	180	8.6	331	83	1.7	81	0.18	
	11/17/04	0																		
	10/18/04	50	CVC/Well	18.0	0.90	7.8	0.64	39.0	1.68	76	2.42	21.0	0.59	182	9.2	324	77	1.9	120	0.19
	09/15/04	70	Intertie	21.0	1.05	14.0	1.15	50.0	2.16	91	2.90	72.0	2.02	252	8.3	476	109	2.1	0	0.18
	08/12/04	50	F-K/CVC	24.0	1.20	7.7	0.63	25.0	1.08	130	4.14	19.0	0.53	165	8.2	302	92	1.2	49	<0.10
Average			21.0	1.05	9.2	0.75	37.3	1.61	99	3.16	34.3	0.96	195	8.6	358	90	1.7	62	0.15	

Notes: * Lab results not available at time of test.

Notes: *Lab results not available at report time.

EXHIBIT "C-1"

ARVIN-EDISON WATER STORAGE DISTRICT CANAL WATER QUALITY SUMMARY

Date	Flow cfs	Source	Calcium		Magnesium		Sodium		Bicarbonate		Chloride		TDS mg/l	pH	EC umhos/cm	Hardness		SAR	Gypsum lbs/AF	Boron mg/l
			mg/l	me/l	mg/l	me/l	mg/l	me/l	mg/l	me/l	mg/l	me/l								
12/22/05	50	F-K	3.4	0.17	1.1	0.09	5.1	0.22	22	0.70	5.0	0.14	28	7.7	54	13	0.6	0	<0.10	
11/08/05	200	CVC	16.0	0.80	11.0	0.90	46.0	1.98	71	2.26	64.0	1.80	210	8.1	400	84	2.2	ND	0.13	
10/11/05	205	F-K	2.6	0.13	0.6	0.05	2.4	0.10	19	0.61	1.2	0.03	17	7.7	31	9	0.4	32	<0.10	
09/09/05	280	F-K	5.0	0.25	0.9	0.07	4.1	0.18	30	0.96	1.4	0.04	30	7.5	52	16	0.4	41	<0.10	
08/08/05	360	F-K	2.8	0.14	0.5	0.04	2.2	0.09	23	0.73	0.8	0.02	19	7.7	31	9	0.3	45	<0.10	
07/08/05	590	F-K	2.7	0.14	0.5	0.04	2.3	0.10	16	0.51	0.8	0.02	16	7.4	28	9	0.3	22	<0.10	
06/15/05	580	F-K	2.1	0.11	0.4	0.03	2.1	0.09	14	0.45	0.7	0.02	13	7.3	24	7		21	<0.10	
Average			5.2	0.26	2.3	0.19	9.9	0.42	29	0.92	11.5	0.32	51	7.6	94	22	0.7	32	0.06	
12/22/05	20	F-K	4.9	0.25	1.5	0.12	6.6	0.28	27	0.86	6.6	0.19	37	7.6	75	19	0.7	0	<0.10	
11/08/05	100	CVC	17.0	0.85	11.0	0.90	46.0	1.98	78	2.48	62.0	1.74	210	8.1	400	87	2.1	ND	0.13	
10/11/05	76	F-K	3.1	0.16	0.7	0.05	2.7	0.12	19	0.61	1.5	0.04	19	7.9	42	10	0.4	22	<0.10	
09/09/05	170	F-K	4.6	0.23	0.8	0.07	3.7	0.16	27	0.86	1.3	0.04	26	7.4	50	15	0.4	33	<0.10	
08/08/05	200	F-K	2.9	0.15	0.6	0.05	2.3	0.10	23	0.73	0.9	0.02	20	7.7	34	10	0.3	45	<0.10	
07/08/05	370	F-K	3.0	0.15	0.5	0.04	2.5	0.11	18	0.57	0.9	0.02	17	7.6	32	10	0.4	24	<0.10	
06/15/05	305	F-K	2.1	0.11	0.4	0.03	2.1	0.09	16	0.51	0.8	0.02	15	7.3	24	7	0.4	30	<0.10	
Average			5.5	0.27	2.3	0.19	9.9	0.43	30	0.96	11.2	0.32	51	7.7	97	23	0.7	31	0.06	
12/22/05	30	F-K	4.9	0.25	1.4	0.11	5.7	0.25	23	0.73	5.0	0.14	32	7.7	62	18	0.6	0	<0.10	
11/08/05	65	CVC	17.0	0.85	10.0	0.82	47.0	2.03	70	2.23	62.0	1.74	210	8.1	410	85	2.2	ND	0.13	
10/11/05	70	F-K	2.7	0.14	0.6	0.05	2.4	0.10	19	0.61	1.3	0.04	18	7.6	32	9	0.4	28	<0.10	
09/09/05	90	F-K	4.6	0.23	1.0	0.08	3.7	0.16	26	0.83	1.3	0.04	26	7.4	61	15	0.4	26	<0.10	
08/08/05	80	F-K	3.6	0.18	0.8	0.06	2.9	0.13	24	0.76	1.0	0.03	23	7.3	39	12	0.4	36	<0.10	
07/08/05	180	F-K	3.0	0.15	0.5	0.04	2.9	0.13	19	0.61	0.8	0.02	18	7.9	86	10	0.4	27	<0.10	
06/15/05	160	F-K	2.3	0.12	0.5	0.04	2.3	0.10	18	0.57	0.7	0.02	16	7.4	24	8	0.4	31	<0.10	
Average			5.5	0.28	2.2	0.18	10.2	0.44	29	0.93	11.2	0.31	52	7.6	109	23	0.7	30	0.06	
10/11/05	20	F-K/CVC	16.0	0.80	11.0	0.90	38.0	1.64	92	2.93	55.0	1.54	190	8.1	360	85	1.8	0	<0.10	
12/20/04	50	F-K/CVC	21.0	1.05	7.2	0.59	35.0	1.51	100	3.18	25.0	0.70	180	8.6	331	83	1.7	81	0.18	
11/17/04	0	CVC/Well	18.0	0.90	7.8	0.64	39.0	1.68	76	2.42	21.0	0.59	182	9.2	324	77	1.9	120	0.19	
10/18/04	50	CVC/Well	22.0	1.10	7.9	0.65	36.0	1.55	67	2.13	28.0	0.79	196	9.2	361	88	1.8	87	0.24	
09/15/04	70	Intertie	21.0	1.05	14.0	1.15	50.0	2.16	91	2.90	72.0	2.02	252	8.3	476	109	2.1	0	0.18	
Average			19.6	1.0	9.6	0.8	39.6	1.7	85.2	2.7	40.2	1.1	200.0	8.7	370.4	88.4	1.9	57.6	0.14	

Notes: *Lab results not available at report time.

EXHIBIT "C-1"
ARVIN-EDISON WATER STORAGE DISTRICT
CANAL WATER QUALITY SUMMARY NOTES

ND:	NONE DETECTED.	pH:	A MEASURE OF ACIDITY. A pH < 7 IS ACIDIC, pH = 7 IS NEUTRAL, pH > 7 IS BASIC. NORMAL RANGE IS 6.5 - 8.4. A pH > 8 MAY NEED TO BE BUFFERED FOR PESTICIDE APPLICATION.
NA:	NOT AVAILABLE OR NOT TESTED.		
mg/l:	MILLIGRAMS PER LITER; SAME AS PARTS PER MILLION.		
me/l:	MILLEQUIVALENTS PER LITER; SAME AS EQUIVALENTS PER MILLION (epm).	EC:	ELECTRICAL CONDUCTIVITY. A MEASURE OF WATER SALINITY; REPORTED IN DECISIEMENS PER METER (dS/m). EQUIVALENT MILLIMHOS PER CENTIMETER (mmho/cm). OR MORE OFTEN, IN MICROMHOS PER CENTIMETER (umhos/cm) WHICH IS 1 X 10 ⁶ EE-6 mhos/cm. EC < 700 IS SATISFACTORY
INTAKE:	SAMPLE TAKEN AT WIBLE RD. SOUTH OF PANAMA LANE.		
NORTH:	SAMPLE TAKEN DOWNSTREAM OF SYCAMORE CHECK GATE.		
SOUTH:	SAMPLE TAKEN DOWNSTREAM OF TEJON CHECK GATE.		
INTERTIE:	TERMINUS OF SOUTH CANAL.		
SOURCE:	WATER SOURCES INCLUDE FRIANT-KERN CANAL (F-K), CROSS VALLEY CANAL (CVC), DISTRICT WELL FIELDS (WELL), OR A MIXTURE OF IMPORTED AND WELL WATER (MIX).	HARDNESS:	HARD WATER, INDICATING CALCIUM AND MAGNESIUM, IS BENEFICIAL FOR AGRICULTURE.
SODIUM:	FOR SURFACE IRRIGATION: SAR < 3 IS GOOD. FOR SPRINKLER IRRIGATION: SODIUM < 3 me/l IS GOOD.	SAR:	SODIUM ABSORPTION RATIO. A RATIO OF SODIUM TO CALCIUM AND MAGNESIUM. EVALUATE WITH EC. SAR = 0 - 3 AND EC > 700 ACCEPTABLE SAR = 3 - 6 AND EC > 1200 ACCEPTABLE
BICARBONATE:	BICARBONATE < 1.5 me/l IS SATISFACTORY FOR OVERHEAD SPRINKLERS.		
CHLORIDE:	FOR SURFACE IRRIGATION CHLORIDE < 4 me/l IS GOOD.	GYPSUM:	AMOUNT OF CALCIUM SULFATE IN POUNDS PER ACRE-FOOT OF WATER APPLIED. INCREASES WATER PERMEABILITY AND HELPS CORRECT EXCESS SODIUM.
TDS:	TDS < 450 IS ACCEPTABLE FOR UNRESTRICTED USE.	BORON:	BORON < 0.70 mg/l IS SATISFACTORY FOR ALL CROPS. EXCESSIVE BORON IS PHYTOTOXIC (BURNS) TO PLANTS.

**ARVIN-EDISON WA STORAGE DISTRICT
DISTRICT WELLS WATER QUALITY
2005**

Date	Well #	Calcium	Magnesium	Sodium	Bicarbonate	Chloride	Nitrate	TDS	pH	EC	Hardness	SAR	Gypsum	Boron
		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	umhos/cm		lbs/AF			mg/l	
North Canal	7/7/2005	66.0	13.0	49.0	240	39.0	11.8	500	7.4	643	220	1.4	< 22	0.20
	7/13/2005	75.0	15.4	49.8	244	42.9	22	438.0	8.0	670	251	1.4	227	0.2
	7/11/2005	99.0	24.0	68.0	290	45.0	70.0	570	7.6	870	340	1.6	0	0.25
	7/20/2005	31.0	5.1	43.0	170	18.0	1.3	230	8.0	420	98	1.9	179	0.52
	7/20/2005	30.1	4.9	47.6	128	24.8	2.8	256	7.9	400	96	2.1	54	0.40
	7/20/2005	30.0	5.0	48.0	160	20.0	1.2	320	7.5	422	95	2.1	< 245	0.50
	7/20/2005	20.0	2.1	52.0	120	21.0	16.0	210	8.2	380	58	3.0	201	0.27
	7/20/2005	18.0	2.4	52.2	92	24.8	15.2	224	8.0	300	53	3.1	100	0.20
	7/20/2005	18.0	2.0	51.0	120	23.0	15.0	270	7.8	360	53	3.0	< 289	0.20
	7/7/2005	12.0	2.0	42.0	120	8.0	1.3	210	8.0	254	38	3.0	< 359	0.40
	7/13/2005	18.5	2.4	28.9	73	5.0	3	175	8.0	446	56	1.6	30	0.22
	7/11/2005	110.0	21.0	85.0	280	80.0	73.0	620	7.6	970	360	4.5	0	0.37
	Average	44.0	8.3	51.2	169.7	29.3	19.4	335.3	7.8	509.6	143.1	2.4	142	0.3
	Maximum	110.0	21.0	85.0	280.0	80.0	73.0	620.0	7.6	970.0	360.0	4.5	22	0.4
Sycamore	7/11/2005	24.0	6.6	21.0	100	21.0	4.1	140	7.7	260	87	1.0	12	ND
	7/13/2005	15.8	4.6	21.1	85	10.0	3.5	173	8.2	210	58	1.2	53	ND
	7/7/2005	17.0	4.0	26.0	110	18.0	1.0	190	8.0	247	59	1.5	< 224	ND
	7/20/2005	24.0	4.3	24.0	120	18.0	3.6	150	8.2	270	77	1.7	92	ND
	7/20/2005	22.0	3.6	23.0	85	21.3	4.2	157	8.0	300	72	1.2	7	ND
	7/20/2005	22.0	4.0	24.0	110	18.0	3.3	200	7.7	268	71	1.2	< 165	ND
	7/11/2005	27.0	5.3	25.0	82	20.0	9.0	160	7.8	280	89	1.2	17	ND
	7/13/2005	18.1	5.6	45.9	92	31.8	9	225	8.3	350	68	2.4	31	0.18
	7/7/2005	9.0	2.0	73.0	170	33.0	<0.4	300	8.6	381	31	5.7	< 585	0.70
	Average	19.9	4.5	31.4	106.0	21.0	4.7	188.3	8.1	285.1	68.1	1.9	132	0.4
	Maximum	27.0	6.6	73.0	170.0	33.0	9.0	300.0	8.6	381.0	89.0	5.7	585	0.7
	7/7/2005	30.0	9.0	17.0	110	33.0	2.3	220	7.7	319	110	0.7	< 24	ND
	7/13/2005	23.0	7.2	27.4	116	16.0	5.4	215	8.1	290	97	1.3	54	0.01
	7/11/2005	27.0	8.8	37.0	150	10.0	1.9	190	7.8	320	100	1.6	179	ND
Telon	7/19/2005	22.0	6.5	25.0	140	15.0	2.5	150	8.1	290	83	1.2	147	ND
	7/19/2005	22.0	7.3	27.6	104	17.7	3.2	184	8.0	300	84	1.3	7	0.01
	7/19/2005	21.0	7.0	27.0	130	16.0	2.2	220	7.8	291	81	1.3	< 196	ND
	7/11/2005	32.0	11.0	36.0	160	17.0	3.0	210	7.8	370	130	1.4	98	ND
	7/13/2005	18.6	4.9	16.9	61	26.2	2	150	8.0	230	67	0.9	63	ND
	7/7/2005	19.0	7.0	25.0	110	20.0	4.6	200	7.8	278	76	1.2	< 143	ND
	Average	23.9	7.6	26.5	120.1	19.2	3.0	191.0	7.9	296.7	91.0	1.2	101	0.0
	Maximum	32.0	11.0	37.0	160.0	33.0	5.4	220.0	8.1	370.0	130.0	1.6	196	0.0

Note: Gypsum requirement levels are highly dependent on reporting limit and small changes in Ca, Mg, HCO3 and CO3 and thus can vary greatly between labs.

ATTACHMENT

J



North West Kern Resource Conservation District

5000 California Ave., #100
Bakersfield, CA 93309
(661) 336-0957 ext 5
Fax (661) 336 0957

January 3, 2006

Board of Directors
CRAIG FULWYLER
President

JIM GRUNDY
Vice President

BRENT PAUL
Secretary-Treasurer

STEPHEN FANUCCI
Director

JIM FORREST
Director

BRYAN BOND
Director

DON PALI A
Director

DAVID COSYNS
Director

ROBERT HEELY
Director

BOB HOCKETT
Manager

CHRISTINE AGUIRRE
District Secretary

Steve Collup, Engineer-Manager
Arvin-Edison Water Storage District
P.O. Box 175
Arvin, CA 93203-0175

Dear Steve,

Enclosed is a copy of the annual report for the North West Kern Resource Conservation District. The period covered is from January 1, 2005 through December 31, 2005.

The following table summarizes the evaluations conducted by the Mobile Irrigation Lab in the Arvin-Edison Water Storage District during 2005.

Table 1. 2005 irrigation season

Grower	System Type	Crop	Acres	DU (%)
D.M. Camp & Sons	Micro-drip	grapes	93	66
Bhogal Farms	Micro-drip	grapes	80	77
Bhogal Farms	Micro-drip	grapes	80	82
Moore Farms	Micro-sprinkler	almonds	40	88
Moore Farms	Permanent UTS	almonds	40	93
Total Acres			333	

The North West Kern Resource Conservation District would like to thank you and the Arvin-Edison Water Storage District for your participation in the Mobile Lab Program. We look forward to working with the land owners in your district in the upcoming season.

Sincerely,

Brian W. Hockett
District Manager

2005 Annual Report
of the
North West Kern Resource Conservation District

2005 ANNUAL REPORT

of the **NORTH WEST KERN** **RESOURCE CONSERVATION DISTRICT**

Formerly the
POND-SHAFTER-WASCO
RESOURCE CONSERVATION
DISTRICT
5000 California Avenue, Suite #100
Bakersfield, CA 93309

DISTRICT DIRECTORS

President	- <i>Craig Fulwyler</i>
Vice-President	- <i>Jim Grundt</i>
Secty-Treasurer	- <i>Brent Paul</i>
Director	- <i>Bryan Bone</i>
Director	- <i>Dave Cosyns</i>
Director	- <i>Stephen Fanucchi</i>
Director	- <i>James Forrest</i>
Director	- <i>Robert Heely</i>
Director	- <i>Don Palla</i>

DISTRICT EMPLOYEES

District Manager	- <i>Brian Hockett</i>
District Secretary	- <i>Christine Aguirre</i>
Air Quality Specialist	- <i>James Booth</i>
Summer Intern	- <i>John-Mark Bergen</i>
Summer Intern	- <i>Travis Kroeker</i>

NATURAL RESOURCES CONSERVATION SERVICE PERSONNEL

District Conservationist	- <i>Mark Davis</i>
Soil Conservationist	- <i>Raul Ramirez</i>
Soil Conservationist	- <i>Daniel Meyer</i>
Air Quality Specialist	- <i>Carol Rush</i>
Soil Scientist	- <i>Charlie Bauer</i>
General Clerk	- <i>Barbara Tokash</i>

GENERAL INFORMATION

After consolidating in 2004 with two other districts, the North West Kern Resource Conservation District has pursued the goals of the District's Long Range Work Plan to the best of its ability.

The North West Kern RCD is comprised of a nine member board, bringing together directors from each of the previous districts. The district consists of 594,360 acres, reaching as far west as the north western portion of Kern County, then along the county line east of Delano, and then almost as far south as Taft, with areas in between that are not included in the boundaries. The map below (Figure 1) shows the boundaries (all in green) of the new district, relative to the former Pond-Shafter-Wasco RCD (outlined in black). Directly to the south is the former Buena Vista RCD, and the Western Kern RCD included everything to the west.

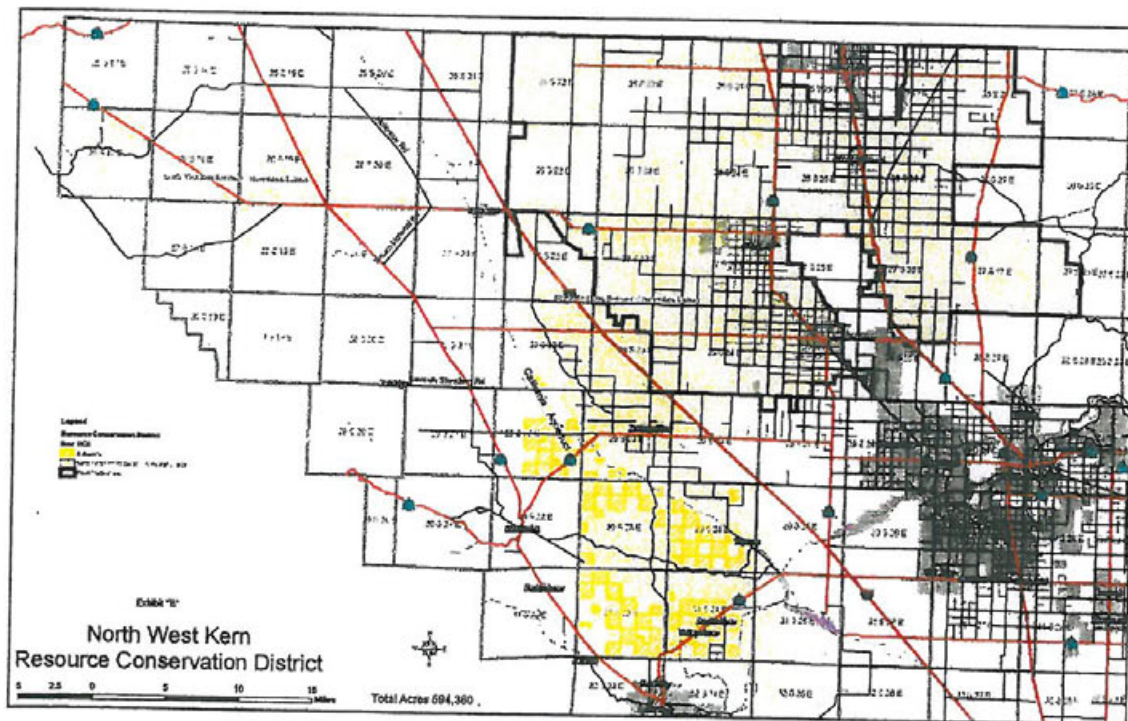


Figure 1. Boundaries of the North West Kern Resource Conservation District.

ACKNOWLEDGMENT

Natural Resources Conservation Service (NRCS) provided assistance to the RCD through in-kind services, of which involved the usage of office space, information, and materials within the office.

CONFERENCES

1. Attended the California Irrigation Institute's Annual Conference on Jan. 27-28 in Davis.

2. Attended the Pacific Rim conference of the Resource Conservation & Development council on October 25-28 in Hilo, HI. This conference brought together RC&D's from the western United States, including California, Oregon, Washington, Alaska, Hawaii, Samoa, and Guam.

3. Attended the California Association of Resource Conservation District's Annual Conference in San Diego on November 16-18.

MEETINGS

1. Regular meetings of the RCD were held at noon on the second Wednesday of every month at the Wasco Valley Rose Golf Course.

2. Attended and participated in a meeting for the San Joaquin Valley Regional Area (made up of RCD's) on April 29 near Oakhurst. This meeting is an opportunity for RCD's to discuss matters of concern that impact the way in which we do business on a daily basis. The fall meeting (held in Clovis on October 21) also included a 'Speak Off' contest, providing an opportunity for high school students to become involved in public speaking. The North West Kern RCD served as facilitator for the 'Speak Off'.

3. Participated in Steering Committee meetings held in Fresno for the San Joaquin Valley Resource Conservation & Development (RC&D) Area. This area includes Kern, Tulare, Fresno, Madera, Merced, and Stanislaus Counties. The mission of the RC&D is to make available the total resources of the USDA and other public-private partnerships to build relationships, create financial leverage, and increase the capability of communities to address their regionally identified resource conservation and development concerns.

There are currently 375 RC&D's nationwide, with ten in California. The authorization of the San Joaquin Valley RC&D would provide for one of the largest nationwide. The North West Kern RCD serves as Treasurer for this organization.

4. Participated in the Environmental Quality Incentives Program (EQIP) Local Work Group Developmental meetings to determine which practices would be cost-shared and to set the cost share level for each. This group is made up of local RCD directors, USDA employees and University of California Cooperative Extension personnel.

5. Conducted monthly safety meetings throughout the year for district employees, as well as for NRCS employees.

WORKSHOPS

1. Attended and participated in an irrigation pump workshop sponsored by the Center for Irrigation Technology at Farm Pump and Irrigation in Shafter on January 21. The workshop covered the topics of pump efficiency, irrigation system uniformity, and pump retrofits.

2. Attended a Fair Political Practices Commission workshop on February 8 in Sacramento.

3. Participated in a workshop/tour on March 2nd for the Department of Water Resources

Senior Land Water Use Analysts here in Kern County.

4. Attended a workshop on Land Trusts/Conservation Easements on March 10 at the University of California Cooperative Extension (UCCE) office. Conservation Easements were discussed as a way to limited urban sprawl into the Agricultural community. However, they are more prevalent in the northern portion of the San Joaquin Valley than here in Kern County, and not viewed as a viable option at this time.

5. Assisted in the coordination of an irrigation workshop that was held on April 27. The workshop covered the topics of 1. Pump Improvement, 2. NRCS EQIP Cost Share for Micro Systems, 3. Protecting Groundwater in Kern County, 4. Irrigation System Uniformity, and 5. Irrigation Scheduling and Soil Moisture Monitoring. The workshop was conducted in cooperation with the UCCE office in Bakersfield.

6. Attended an Agricultural Drainage workshop on October 19 at the Buena Vista Water Storage District. The workshop was conducted by the Center for Irrigation Technology.

EVENTS

Attended and participated in the California Envirothon on April 14 & 15 as an oral presentation judge. The event was held near Oakhurst, CA, with teams of high school students from all over California participating.

The Envirothon provides an opportunity for youth, grades 9 – 12, to compete in a natural resources setting. They are tested in the areas of soils, aquatics, forestry, wildlife, and a current issue. The event is usually held in a different part of the state every year.

POSO CREEK

Poso Creek presented no flooding problems in 2005. Routine maintenance was conducted by the Semitropic Water Storage District from Leonard Avenue to the west, and by the North Kern Water Storage District east of Leonard.



Figure 2. Sign installed to discourage illegal dumping.

Through the course of the year, the district has provided assistance to a local land owner to negotiate with the Department of Fish & Game for work in and on the Poso Creek levee. The district has also worked with the Kern County Waste Management Board to secure a new "No Dumping" sign (Figure 2 on the previous page) that was posted at the intersection of Palm Avenue and Blankenship, north of Wasco, near a former illegal dump site along Poso Creek, replacing a sign that was knocked over by a drunken driver.

AIR QUALITY

In 2004, with farmers under pressure from the air quality requirements of Senate Bill (SB) 700, the North West Kern RCD partnered with NRCS to provide technical assistance in completing the Conservation Management Plans (CMPs) required by the San Joaquin Valley Air Pollution Control District (SJVAPCD). By the end of December more than 500 CMPs were completed in Kern County, representing 135,000 acres, 13,000 cows, and 350,000 chickens.

Additionally, the North West Kern RCD lent assistance in implementation of air quality initiatives supported by the Environmental Quality Incentives Program (EQIP). EQIP provides funds to help growers switch from burning of orchard and vineyard trimmings to chipping; apply road oil to dusty farms roads; and replace old inefficient diesel irrigation pump motors with newer, more environmentally friendly ones.

With 6,400 CMPs completed representing 3.3 million acres valley-wide, preliminary estimates are that Ag has reduced somewhere between 34 and 36 tons of particulate matter as reported by the SJVAPCD. Additionally, in Kern County, 43 air quality EQIP contracts were initiated. Overall, RCD accomplishments far exceeded expectations and for this reason the decision was made to extend the air quality contract for another year.

In 2005, with an anticipated decline in the number of CMPs, it was decided that air quality priorities would focus on the further initiation and completion of EQIP contracts. It was further decided that the role of the RCD's partnership with NRCS should expand to include outreach, non-air quality EQIP contracts, and office technical assistance.

2005 has been a busy year, and as of December 1st new CMPs numbered a mere 18, however 47 new air quality EQIP contracts were assisted. Additionally, 35 non-air quality EQIP contracts were submitted, and follow-up work on 15 previous contracts completed.

Outreach activities to the community have been varied. The North West Kern RCD participated in Farm Day in the City, in which elementary school children were taught the importance of air quality. The RCD also worked with local Boy Scout troops and developed presentations on Air Quality and Soil Science which were specifically designed for youth (14 – 17 years old), both of which, so far, have met with considerable positive feedback. An air quality presentation for Ag owner/operators is currently under construction. Development and delivery of direct mailings and publication bulletins is on-going, and the RCD has worked hard to not only provide assistance to NRCS but also to place itself in the position of air quality liaison to the community.

Anticipated 2006 goals will likely be to continue the good work that was accomplished in 2005, with an expanded emphasis on new air quality programs dealing with grape stakes,

dairies, animal feedlots, and poultry farms. Outreach and community education remain significant parts of the 2006 agenda as well as the necessary day to day assistance provided in-house to NRCS.

FUNDING

The Mobile Lab is funded mostly by local agencies, such as the Kern County Water Agency, Water Districts, and Resource Conservation Districts. In addition, the North West Kern RCD received funds from the US Bureau of Reclamation for Mobile Lab evaluations outside of Kern County. The Natural Resources Conservation Service provided funding for evaluations conducted as follow up for the EQIP program, and the California Association of RCD's provided a grant for an Air Quality position.

Contributions to the Mobile Lab for the 2005-2006 fiscal year were as follows:

North Kern WSD	\$ 6,000.00
Lost Hills WD	\$ 3,000.00
Arvin-Edison WSD	\$ 6,000.00
Buena Vista WSD	\$ 2,500.00
Kern Delta WD	\$ 4,000.00
Cawelo WD	\$ 5,000.00
Semitropic WSD	\$ 6,000.00
Shafter-Wasco ID	\$ 4,000.00
Tehachapi-Cummings CoWD	\$ 1,000.00
Southern San Joaquin MUD	\$ 3,000.00
Belridge WSD	\$ 2,500.00
Henry Miller WD	\$ 2,500.00
Kern Tulare WD	\$ 750.00
Rag Gulch WD	\$ 750.00
Wheeler Ridge-MWSD	\$ 3,500.00
Rosedale Rio-Bravo WSD	\$ 750.00
Pond-Shafter-Wasco RCD	\$ 4,000.00
USBR-Mobile Lab Evaluations	\$ 25,000.00
CARCD-Air Quality Contract	\$ 40,000.00
NRCS-EQIP Follow up Evals	\$ 25,000.00
Total Contributions -	\$160,250.00

MOBILE LAB PROGRAM ANNUAL PROGRESS REPORT

For services performed from January 1, 2005 to December 31, 2005.

IRRIGATION SYSTEM EVALUATIONS

A total of 87 evaluations were conducted on 7372 acres during the 2005 irrigation season.

Table 1. Summary of evaluations conducted.

System Type	Number of Evaluations	Acres Evaluated	Average DU (%)
Border Strip	1	29	98
Micro Drip	43	4164	82
Micro Sprinkler	41	2989	81
Permanent Undertree	1	40	93
Solid-Set Sprinkler	1	150	58
Totals	87	7372	

Table 2. Evaluation summary by system type.

System Type	Crop	DU (%)	Acres
<i>Border Strip</i>	Pistachios	98	29
<i>Micro-Drip</i>	Almonds	82	300
	almonds	90	38
	almonds	92	38
	almonds	88	30
	almonds	87	36
	almonds	85	135
	almonds	88	75
	almonds	96	58
	almonds	94	110

Table 2 (cont). Evaluation summary by system type.

System Type	Crop	DU	Acres
<i>Micro-Drip (con't)</i>	almonds	98	90
	Apples	81	83
	Citrus	88	108
	Grapes	54	155
	grapes	59	301
	grapes	66	93
	grapes	62	44.8
	grapes	77	80
	grapes	90	40
	grapes	66	38
	grapes	89	65
	grapes	78	36
	grapes	82	80
	grapes	89	56
	grapes	88	125
	grapes	84	120
	grapes	69	40
	grapes	68	40
	Pistachios	86	115
	pistachios	98	87
	pistachios	87	266
	pistachios	65	320
	pistachios	87	72
	pistachios	92	18
	pistachios	93	7
	pistachios	96	20
	pistachios	96	44.4
	pistachios	96	81
	pistachios	95	75
	pistachios	70	25
	pistachios	82	305
	pistachios	77	13
<i>Buried Drip</i>	Tomatoes	80	154
	tomatoes	46	147
<i>Micro-Sprinkler</i>	Almonds	80	285
	almonds	68	80

Table 2 (cont). Evaluation summary by system type.

System Type	Crop	DU	Acres
<i>Micro-Sprinkler (con't)</i>	almonds	92	52
	almonds	78	50
	almonds	92	76
	almonds	95	50
	almonds	94	50
	almonds	84	44
	almonds	88	40
	almonds	49	74
	almonds	75	42
	almonds	74	42
	almonds	74	37
	almonds	76	44
	almonds	89	37
	almonds	94	37
	almonds	88	35
	almonds	90	24
	almonds	59	42
	almonds	88	39
	almonds	67	197
	almonds	96	53
	almonds	87	150
	almonds	80	91
	almonds	89	35
	almonds	92	150
	almonds	95	150
	almonds	89	148
	almonds	73	75
	almonds	93	62.5
	Cherries	74	25
	cherries	74	40
	Citrus	59	100
	citrus	79	93
	citrus	68	40
	citrus	87	80
	citrus	71	53
	citrus	84	62
	citrus	77	91
	citrus	79	38
	Pistachios	71	75
<i>Permanent Undertree Sprinkler</i>	Almonds	93	40
<i>Solid Set Sprinkler</i>	Carrots	58	150
Total Acres =			7372

OBSERVATIONS AND RECOMMENDATIONS

Border Strip

This evaluation was conducted as a follow-up to the EQIP program. Areas of concern not only included observing the advance and recession of the irrigation water, but also the ability of the grower to better irrigate his orchard based on the crop water needs of the trees. By installing soil moisture monitoring devices throughout the field, the grower was able to monitor soil moisture conditions and then to meet the crop water needs of the trees in a timely manner. The inclusion of this practice helps to make the overall irrigation water management practice more efficient as it enables the grower to provide water to the trees when they need it and in the proper amount.

Micro-Irrigation Systems

The main cause of non-uniformity during the irrigation season was due to a variation in system pressures. These variations were typically due to improperly set control valves. Another cause of the variations was attributed to plugged hose screens, as seen in *Figure 3* below. In some cases, growers had removed the hose screens completely in order to remedy the problem, but this can potentially lead to other complications.



Figure 3. Extreme case of plugging. Most screens are not this bad.

Other observations and recommendations made during the season included:

1. **Flow Meter** – This is an indispensable management tool that can help to monitor the amount of water applied throughout the season. Also, checking the flow meter frequently can help to detect system problems. For example, a steady decline in flow rate may indicate pump wear or a drop in the water level of a well. A slight decline in flow rate can indicate emitter plugging as well.

2. Flush-outs – Manifold flush-outs should be opened periodically to flush out silt and debris that was not removed by the filters. The frequency that is necessary will depend on the size of the manifold and the effectiveness of the filters.
3. Hose Flushing – With micro-irrigation systems, it is very important to periodically undo the ends of each individual line and flush the dirt and debris from it. If this is not done on a regular basis, hoses can become plugged.
4. Leaks – It is important that irrigation workers are aware of leaks due to damaged hoses, missing emitters, etc. Even a small leak can reduce the pressure in a line and cause a non-uniform application of water.
5. Different Emitter Types – Mixing emitters can adversely affect the distribution uniformity by applying more or less water to those plants with different emitters. Emitters are often mixed accidentally by irrigation workers when they come across a broken or plugged emitter in the field. When repairing these emitters, they may sometimes substitute a different emitter type because it is the only one available at the time.
6. Chlorine Injection – With micro-irrigation systems, bacteria and algae can build up inside the hoses and emitters and may eventually cause clogging. This can be avoided by regularly injecting chlorine into the system.

Permanent Undertree Sprinkler

Only one system was tested and it proved to be quite uniform. However, there were some observations made that led to recommendations that would improve the overall efficiency of the system as a whole.

It was observed that some of the pressure gauges around the pump station were broken and needed to be replaced. These are important to see how much pressure is being lost through the filters, which could indicate a potential problem at this location. There were also leaning risers which could affect the application of water.

Solid Set Sprinkler

This was a typical evaluation with slightly lower than normal results. The biggest cause of non-uniformity in a system of this type is from the wind. Other factors involved include, but are not limited to, pressure variations, worn nozzles, leaning risers, different nozzle sizes, and leaky gaskets.

Gearing up for the 2006 irrigation season

As growers are preparing for the upcoming season, the Mobile Lab will be available to assist them with their irrigation needs. Being an efficient water manager is essential in today's environment, as we are faced with many water related issues that may impact the way we do business in the future.

ATTACHMENT

K

**ARVIN-EDISON WATER STORAGE DISTRICT
WATER ORDER**

DATE: _____

TIME: _____

☐ MAGNITUDE

☐ G.P.M.

☐ C.F.S.

☐ A.F.

☐ HARVEST

☐ INCREASE

☐ DECREASE

☐ FROST

☐ USER ADJUST

☐ WIND

☐ HEAT

☐ TEST

☐ EMERGENCY OFF

☐ PESTICIDE

☐ FERTILIZER

☐ GERMINATION

TURNOUT _____ REQUESTED FLOW _____ ON _____ DATE _____ OFF _____ DATE _____ ON _____ DATE _____ OFF _____ DATE _____

TURNOUT _____ REQUESTED FLOW _____ ON _____ DATE _____ OFF _____ DATE _____ ON _____ DATE _____ OFF _____ DATE _____

TURNOUT _____ REQUESTED FLOW _____ ON _____ DATE _____ OFF _____ DATE _____ ON _____ DATE _____ OFF _____ DATE _____

TURNOUT _____ REQUESTED FLOW _____ ON _____ DATE _____ OFF _____ DATE _____ ON _____ DATE _____ OFF _____ DATE _____

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TURNOUT _____ REQUESTED FLOW _____ ON _____ DATE _____ OFF _____ DATE _____ ON _____ DATE _____ OFF _____ DATE _____

ORDERED BY: _____

FOR: _____ Ph # _____

COMMENTS: _____

DISPATCHER: _____

**ARVIN-EDISON WATER STORAGE DISTRICT
WATER ORDER**

DATE: _____

TIME: _____

☐ MAGNITUDE

☐ G.P.M.

☐ C.F.S.

☐ A.F.

☐ HARVEST

☐ INCREASE

☐ DECREASE

☐ FROST

☐ USER ADJUST

☐ WIND

☐ HEAT

☐ TEST

☐ EMERGENCY OFF

☐ PESTICIDE

☐ FERTILIZER

☐ GERMINATION

TURNOUT _____ REQUESTED FLOW _____ ON _____ DATE _____ OFF _____ DATE _____ ON _____ DATE _____ OFF _____ DATE _____

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TURNOUT _____ REQUESTED FLOW _____ ON _____ DATE _____ OFF _____ DATE _____ ON _____ DATE _____ OFF _____ DATE _____

ORDERED BY: _____

FOR: _____ Ph # _____

COMMENTS: _____

DISPATCHER: _____

ATTACHMENT

L

Monthly Report

California Irrigation Management Information System

Department of Water Resources

Office of Water Use Efficiency

Rendered in ENGLISH units

January 1, 1996 - December 31, 2005

Printed on August 20, 2007

San Joaquin Valley - Arvin-Edison - 125

Date	Tot ET _o (in)	Tot Precip (in)	Avg Sol Rad (Ly/Day)	Avg Vap Pres (mBars)	Avg Max Air Temp (F)	Avg Min Air Temp (F)	Avg Air Temp (F)	Avg Max Rel Hum (%)	Avg Min Rel Hum (%)	Avg Rel Hum (%)	Avg Dew Point (F)	Avg Wind Speed (mph)	Avg Soil Temp (F)
Jan 1996	1.23	1.22 K	168	9.8	58.1 K	39.6 K	48.1	97	66	85	43.8	3.2	52.0
Feb 1996	1.82	3.31	236 K	12.3 K	64.6 K	46.6 K	54.8	96	61	82 K	49.3 K	3.3	57.2 K
Mar 1996	4.11	0.55	426	11.3 K	70.2	46.1 K	58.1	91	46	68 K	47.2 K	3.6	60.7
Apr 1996	6.02	0.08	539	10.5	77.2	50.3 K	64.0	80	33	52	45.4	4.3	66.2
May 1996	8.09	0.20 K	666	11.1 L	82.7	54.4 K	70.1	71	27	44 L	46.7 L	4.4	73.5
Jun 1996	8.89	0.00	719	13.5	90.7	61.5 K	77.7	68	27	42	52.3	4.0	79.3
Jul 1996	9.38	0.20	691	15.8	97.7	68.2	84.4	64	25	39	56.8	3.7	83.1
Aug 1996	9.00	5.08 L	646	15.2 L	96.3	65.6 K	82.5	65	26	41 L	55.3 L	3.8	82.4
Sep 1996	6.45	0.83 L	536 K	12.0	88.1	57.7	73.4	66	28	43	49.2	3.6	74.4
Oct 1996	4.25 K	0.91	366 K	10.6 K	76.8 K	48.8 K	63.0	81	34	53 K	45.1 K	3.7	66.4
Nov 1996	1.85	1.18	230 K	11.8 L	65.5	43.8 K	54.4	96	58	80 L	47.9 L	2.9	58.7
Dec 1996	1.17	2.01	167	10.7 K	59.4	40.5 K	49.2	99	67	88 K	44.5 K	3.2	53.4
Jan 1997	1.35	2.95	185	11.1 K	59.8 K	43.3 K	50.4	99	66	87 K	45.6 K	3.5	52.9 K
Feb 1997	2.05	0.98	287 K	9.8	61.3	40.1	50.7	96	56	78	43.8	3.4	53.8
Mar 1997	4.83 K	0.08 K	485 K	10.6 L	74.0 K	46.1 K	60.3	87	37	60 L	45.7 L	3.7 K	59.9
Apr 1997	6.23	0.75 K	586 K	10.2 K	75.2	48.9 K	62.9	79	32	51 K	44.1 K	4.3	64.9
May 1997	8.39	0.00	655	12.9 K	86.8	59.7 K	74.2	71	28	44 K	50.9 K	4.5	73.3
Jun 1997	8.38	0.00	673	14.1 K	87.3	61.2	75.4	72	31	47 K	53.4 K	4.4	75.0
Jul 1997	8.89	0.04 K	666	15.7	93.5	64.2	80.5	71	29	44	56.6	3.8	78.9
Aug 1997	8.36	0.00	620	17.1 L	92.4	65.2 K	79.6	74	35	50 L	58.9 L	3.9 K	79.3
Sep 1997	6.07	0.08	516 K	15.8 K	90.2	61.5 K	76.1	77	34	52 K	56.5 K	3.7	75.4
Oct 1997	4.30	0.04	411 K	10.4 K	78.3	47.9 K	62.7	79	33	53 K	44.8 K	3.5	65.6
Nov 1997	2.00 K	1.42 K	236 K	11.4 L	68.4 K	44.3 K	55.6	94	54	76 L	47.9 L	2.8	59.1
Dec 1997	1.52	0.31	189	8.2	56.8 K	35.9 K	45.6	96	58	79	39.1	3.6 K	50.5
Jan 1998	1.46 K	1.93 K	200 K	10.8 K	60.8 K	42.2 K	50.4	98	65	86 K	46.1 K	3.0	52.1
Feb 1998	1.52 K	7.44 K	201 K	10.7 K	60.0	43.6	51.5 K	98 K	62 K	82	46.2	4.0 K	52.8 K
Mar 1998	3.56	3.94 K	393 K	11.7	66.7 K	46.3	56.1	96	54	75	48.3	3.6	59.1 K
Apr 1998	5.03 K	2.83	495 K	11.4 L	69.9 K	46.5 K	58.4	94	47	69 L	47.7 L	3.8	62.2
May 1998	5.56	1.61	532	12.8	71.7 K	51.7	61.5	91	48	69	50.9	4.3	68.7
Jun 1998	7.48	0.24	631	15.1 L	83.7 K	58.7 K	72.2	84	39	57 L	55.5 L	3.9	75.7

Monthly Report

San Joaquin Valley - Arvin-Edison - 125

Date	Tot ETo (in)	Tot Precip (in)	Avg Sol Rad (Ly/Day)	Avg Vap Pres (mBars)	Avg Max Air Temp (F)	Avg Min Air Temp (F)	Avg Air Temp (F)	Avg Max Rel Hum (%)	Avg Min Rel Hum (%)	Avg Rel Hum (%)	Avg Dew Point (F)	Avg Wind Speed (mph)	Avg Soil Temp (F)
Jul 1998	9.00	0.08 K	688	18.1	96.0	66.4 K	82.3	75	32	48	60.5	3.6	83.0
Aug 1998	8.47	0.00	609	18.4 K	97.5 K	66.5 K	83.0	75	31	48 K	60.8 K	3.3	83.0
Sep 1998	5.61	0.55	504 K	17.4 K	87.1 K	61.2 K	73.9 K	85 K	41 K	60 K	57.0 K	3.6	76.7
Oct 1998	3.89 K	0.51	395 K	11.0	76.3 K	47.0	61.2	86	39	61	46.6	3.2	64.5
Nov 1998	1.88 K	1.18	240	10.8	64.0	41.5	52.2	97	57	81	46.4	2.9	57.4
Dec 1998	1.48	1.18	223	7.9 L	56.1 K	33.2 K	43.3	97	56	81 L	37.7 L	3.2	49.6
Jan 1999	1.45	3.27 K	209 K	8.7	56.0 K	35.7 K	44.4	99	65	87	40.5	3.3	47.3
Feb 1999	2.18	0.91	300 K	9.8	62.5	40.8	51.0	95	54	76	43.4	3.5	52.1
Mar 1999	3.68	0.24	395 K	9.5	64.8 K	42.7	53.8	90	46	67	42.9	4.3	56.8
Apr 1999	5.59	0.59	530 K	9.3	70.7 K	46.5 K	58.8	81	37	56	42.1	4.8	61.5
May 1999	7.78	0.12	678	11.9 K	80.0	53.8 K	68.0	75	34	50 K	48.5 K	4.3	72.1 K
Jun 1999	8.38	0.00	695	13.5 K	88.0 K	59.8 K	75.2	71	30	45 K	52.0 K	4.0	78.8 K
Jul 1999	8.83	0.00	684	15.6 K	93.9	64.4 K	80.1	69	29	44 K	56.1 K	3.5	82.5
Aug 1999	8.46	0.00	669 K	16.1	91.5	62.9 K	78.0	74	35	50	57.3	3.8	80.0
Sep 1999	6.39	0.00 K	559 K	15.0 K	91.1	59.9	76.0 K	74 K	32 K	49 K	55.1 K	3.1 K	76.7 K
Oct 1999	4.56 K	0.00	422 K	11.0 L	84.7 K	50.1 K	67.0	74	31	49 L	46.6 L	3.0	69.3 K
Nov 1999	1.87 K	0.01 L	207 L	10.8 L	67.1 L	40.9 L	53.1 L	95 K	54 K	78 L	46.0 L	2.9 L	58.2 L
Dec 1999	1.53	0.01	173	7.3	61.1 K	33.1	46.2 K	90 K	45 K	69	36.2	3.1	50.0
Jan 2000	1.15 K	0.17 L	202 L	8.5 L	61.5 L	37.6 L	48.7 L	92 K	55 K	73 L	39.5 L	2.9 L	49.5 L
Feb 2000	2.30 K	2.40	242 K	10.8 L	65.6 K	45.0	55.7 K	94 K	49 K	74 L	46.3 L	4.4 K	55.1
Mar 2000	3.66 K	1.42	367 K	11.1 L	66.8 K	46.1	57.0 K	92 K	52 K	70 L	47.0 L	3.7	59.1 K
Apr 2000	4.57	0.59 L	393 L	11.7 L	77.0 L	50.2 L	64.3 L	85	37	57 L	48.4 L	4.0 L	66.1 L
May 2000	7.38	0.04	598	13.7 L	83.5 K	55.7 K	71.4	78	36	52 L	52.3 L	4.4	73.6 K
Jun 2000	8.77	0.12	707	16.4 K	93.2	63.7 K	79.7	74	32	47 K	57.1 K	3.8	81.6 K
Jul 2000	8.83	0.00	684	15.8	94.2	63.9	79.9	72	29	45	56.7	3.5	82.5
Aug 2000	8.35	0.12	612	16.2	96.2	65.0 K	81.4	71	28	44	57.2	3.2	82.6
Sep 2000	5.79	0.00	505	14.8	89.8 K	59.0	74.0	76	34	52	54.9	3.2	75.7
Oct 2000	3.70	0.79 K	353	13.2	78.1 K	51.6	64.2	90	43	65	51.8	2.9	68.2
Nov 2000	1.96 K	0.04	256 K	8.9	61.6 K	35.7	47.8	96	53	78	41.0	2.8	54.1
Dec 2000	1.44 K	0.04	197 L	8.9 L	61.0 L	36.3 L	47.0 L	96 K	59 K	81 L	41.3 L	2.6	50.2 L
Jan 2001	1.67	2.44 K	221	8.4	59.4 K	37.1	47.0	96	53	77	39.9	3.1	48.0
Feb 2001	2.16 K	2.01	286 K	9.3	60.7 K	39.6	49.7	95	54	76	42.3	3.7	50.4
Mar 2001	4.08 K	0.71 K	401 K	12.2	70.5 K	49.7 K	60.3	92	49	69	49.6	3.9 K	59.5
Apr 2001	5.29	0.87 K	526	10.8 K	70.3	47.7 K	59.4	89	41	62 K	45.9 K	4.0	64.9
May 2001	8.27 K	0.00	631 L	12.5 L	89.5 K	57.2 L	77.1 L	70 K	25 K	41 L	50.4 L	4.1	76.4 L
Jun 2001	9.42	0.04 K	741	12.8	92.9	62.2 K	79.2	64	23	38	50.8	4.4	79.7
Jul 2001	9.09	0.04	682	16.6 K	94.5	65.8 K	81.6	70	30	45 K	57.9 K	4.0	81.3
Aug 2001	8.74 K	0.00 K	647 K	16.3 K	95.4	64.3 K	81.4 K	71 K	30 K	45	57.4	3.8 K	79.8 K

Monthly Report

San Joaquin Valley - Arvin-Edison - 125

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Sep 2001	6.40 K	0.00 K	542 K	14.8 K	90.1 K	59.7 K	75.9 K	74 L	32 L	48 L	54.8 L	3.6 K	75.7 K
Oct 2001	4.28 K	0.12	377 K	12.6 K	81.8 K	52.9 K	67.1	81	39	57 K	50.6 K	3.0	69.9
Nov 2001	2.07 K	1.73	246	12.7 K	68.2 K	45.5 K	56.1	98 K	58 K	83 K	50.5 K	2.9	62.7 K
Dec 2001	1.23 K	0.77 L	180 L	10.3 L	58.2 L	38.8 L	48.0 L	99 L	66 L	88 L	44.8 L	3.0 L	52.6 L
Jan 2002	1.32 K	0.08	204 K	8.8	54.2 K	35.1	44.2	99	67	87	40.5	2.9	50.4
Feb 2002	2.68 K	0.01	320 K	8.6 K	65.9 K	39.2	52.1	89	41	66 K	39.7 K	3.3 K	52.8
Mar 2002	4.55	0.06 K	455 K	8.0 K	68.4 K	41.9	55.5	82	32	53 K	37.6 K	4.2 K	59.5 K
Apr 2002	5.54	1.14	499	10.3	73.9	49.2 K	62.6	78	35	53	44.4	4.2	68.4
May 2002	7.97	0.35 K	660 K	10.3	81.3 K	53.4 K	69.0	71	27	43	44.8	4.4	73.2 K
Jun 2002	9.17	0.00	700	12.1	90.7	61.5 K	78.0	64	23	37	49.2	4.4	80.7
Jul 2002	9.49	0.00	657	14.0	96.7	67.1	83.4	60	22	36	53.3	4.1	83.1
Aug 2002	8.79	0.04	606	12.1	94.4	62.5	79.7	61	20	35	49.4	3.8	78.6
Sep 2002	6.39	0.04	487	11.1	90.4	59.6	75.5	62	23	38	47.3	3.7	76.7
Oct 2002	4.05	0.00	352	9.9	76.9 K	48.7	62.8	77	33	52	43.9	3.1	68.3
Nov 2002	1.95	1.89	226	10.8 K	67.1	42.8 K	53.8	93	52	76 K	45.6 K	2.9	61.1
Dec 2002	1.58 K	1.81	188	9.1	61.0	38.5	48.9	95	53	78	42.0	3.4 K	55.3 K
Jan 2003	1.36	0.31	192	10.7	59.6	40.8	49.1	99	72	90	46.2	2.7	53.5
Feb 2003	2.25	2.28	258	9.2 K	60.7	41.8	51.2	90	52	71 K	40.7 K	4.5 K	54.9
Mar 2003	4.15	0.71	412 K	10.1 K	70.0 K	44.8	57.9	89	40	62 K	44.2 K	3.8	60.4
Apr 2003	4.88	1.54	479	9.7	68.7 K	46.5 K	57.8	87	38	60	43.6	4.3	65.7
May 2003	7.10 K	0.28 L	577 K	11.7 K	81.2 K	55.6 K	68.8 K	78 K	31 K	49 K	48.5 K	4.2 K	72.0 K
Jun 2003	8.51 K	0.16 K	680 K	13.3 K	91.2	62.8 K	78.3 K	67 K	26 K	40	51.6	3.8 K	82.6 K
Jul 2003	8.74 K	0.04 L	646 L	13.6 L	97.9 L	67.9 L	84.4 L	60 L	20 L	33 L	52.3 L	2.5 L	85.5 L
Aug 2003	7.83 K	0.00 L	593 L	15.2 L	93.6 L	65.9 L	80.6 L	68 L	28 L	43 L	55.6 L	2.5 L	85.2 L
Sep 2003	6.27	0.00	505	13.9	92.9	62.4 K	78.1	67	27	43	53.0	2.7	82.6 K
Oct 2003	4.71	0.01	387 K	10.6	83.8	52.0 K	68.0	73	26	45	45.6	3.4	72.7
Nov 2003	1.92	0.40	230 K	9.2 K	63.2	39.9 K	50.9	92	46	70 K	41.1 K	3.1	61.5
Dec 2003	1.55 K	2.40 K	180	8.7	61.1 K	38.9	49.4	92	50	73	40.6	3.3 K	56.1 K
Jan 2004	1.09	0.67	160	9.0	54.0 K	38.7	46.1	96	68	85	41.7	2.9	53.0
Feb 2004	2.17	3.27	264	8.6 K	62.3	40.6	50.6	90	46	69 K	40.1 K	3.5	55.1
Mar 2004	4.73 K	0.47	448	12.1	75.7 K	50.0 K	62.6	88	40	63	49.2	3.6	65.2 K
Apr 2004	6.57 K	0.00	597 L	8.8	78.0 K	49.6 K	65.1	73	25	43	40.9	4.2	71.6 K
May 2004	8.33	0.00	673 L	9.7	83.2	54.7	70.2	66	23	39	43.5	4.6	76.0
Jun 2004	9.03	0.00	694	11.9	89.5	61.8	77.0	62	23	38	48.9	4.4	81.1 K
Jul 2004	9.53	0.00	671	13.5	96.3	66.7	82.8	59	22	35	52.3	4.0	84.4
Aug 2004	8.74	0.00	610	13.7	94.0	64.5	80.4	62	25	39	52.9	3.8	84.3 K
Sep 2004	6.56	0.12	518	10.0 K	89.2 K	57.6 K	74.1	59	21	36 K	44.2 K	3.5	78.7 K
Oct 2004	3.76	1.34	334	11.5	75.4 K	50.0	62.7	84	40	61	47.9	3.5 K	70.8

Monthly Report

San Joaquin Valley - Arvin-Edison - 125

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Nov 2004	1.87	0.08	228	9.3 K	62.4 K	39.6 K	50.3	93	47	73 K	41.7 K	3.1	61.7
Dec 2004	1.49	1.18	168	8.1	57.4	35.3 K	45.5	93	56	78	38.3	3.7 K	53.7
Jan 2005	1.16	2.09	151	10.2 K	55.9	42.8 K	49.0	97	70	86 K	44.7 K	3.3 K	55.0
Feb 2005	1.92	1.02	241	10.8	63.5	44.7	53.4	94	57	77	46.3	3.5	56.8
Mar 2005	3.28 K	0.67 L	339 L	10.2 L	68.1 L	46.2 L	56.4 L	87 L	43 L	67 L	45.3 L	3.7 L	61.7 L
Apr 2005	5.20	1.06	492 L	9.8	72.4	46.7 K	59.9	86	34	56	43.6	4.2	66.2
May 2005	6.99	2.56	586	13.2	80.5	56.4 K	68.9	84	36	56	51.9	4.4	75.3 K
Jun 2005	8.07 K	0.04 K	671	12.6	85.1	59.1 K	73.0	72	30	45	50.3	4.3	80.7 K
Jul 2005	9.63	0.00	687	16.4	99.9	69.5 K	85.9	66	23	39	57.6	3.8	88.1 K
Aug 2005	9.15 K	0.00	644	13.5 K	97.1	65.7 K	82.6	63	21	36 K	52.2 K	3.8 K	88.1 K
Sep 2005	5.86 K	0.00	529 K	11.7	86.1	55.2	71.3	74	26	45	48.4	2.7 K	78.5 K
Oct 2005	3.95 K	1.18 L	379 L	12.0 L	76.1 L	49.5 L	62.8 L	85 L	41 L	62 L	48.7 L	3.4 L	70.7 L
Nov 2005	2.37	0.31	268	10.2	69.7	42.9	55.1	90	43	68	44.6	3.0	63.7 K
Dec 2005	1.36	2.13	177	10.1 K	61.7 K	40.4 K	50.3	95	58	80 K	43.9 K	2.9	56.6 K
Totals	606.43	95.06	443	11.8	76.6	51.0	64.0	82	41	60	47.9	3.6	67.4

Flag Legend

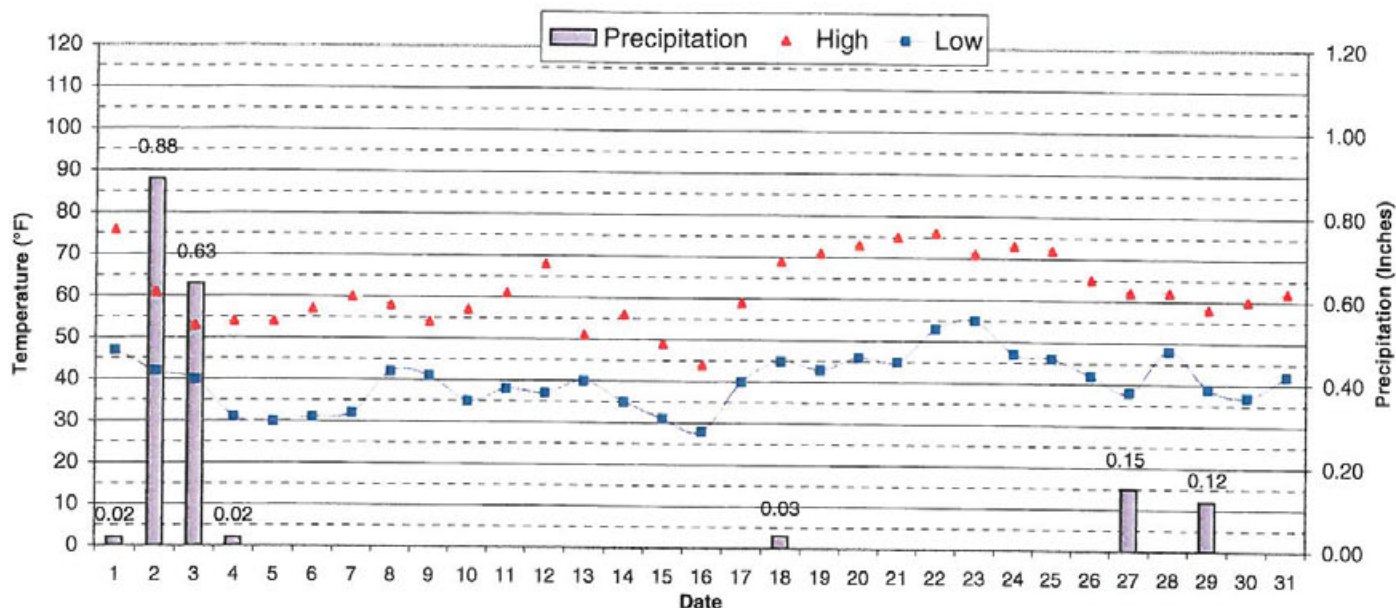
M - All Daily Values Missing	K - One or More Daily Values Flagged
J - One or More Daily Values Missing	L - Missing and Flagged Daily Values

Conversion Table

W/sq.m = Ly/day / 2.065	inches * 25.4 = mm
C = 5/9 * (F - 32)	m/s = mph * 0.447
kPa = mBars * 0.1	

EXHIBIT "D"
ARVIN-EDISON WATER STORAGE DISTRICT
SUMMARY OF CLIMATOLOGICAL OBSERVATIONS

December 2005



PRECIPITATION	OFFICE (1)		SYCAMORE (2)		TEJON (3)	
	INCHES	% OF AVG.	INCHES	% OF AVG.	INCHES	% OF AVG.
AVG. MONTHLY	1.00		1.01		0.93	
AVG. YEAR TO DATE	2.75		2.77		2.41	
CURRENT MONTH	1.85		1.75		1.23	
CUMULATIVE (7/1 - 6/30)	3.30	120%	3.16	114%	2.64	110%

TEMPERATURE	(°F)	DATE	TIME
MAXIMUM TEMPERATURE	76.2°	12/22/05	2:00 PM
AVERAGE MAXIMUM TEMPERATURE	62.0		
# DAYS THIS MONTH ABOVE 100 °F	0		
MINIMUM TEMPERATURE	28.5°	12/16/05	5:00 AM
AVERAGE MINIMUM	40.2		
# DAYS THIS MONTH BELOW 32 °F	5		

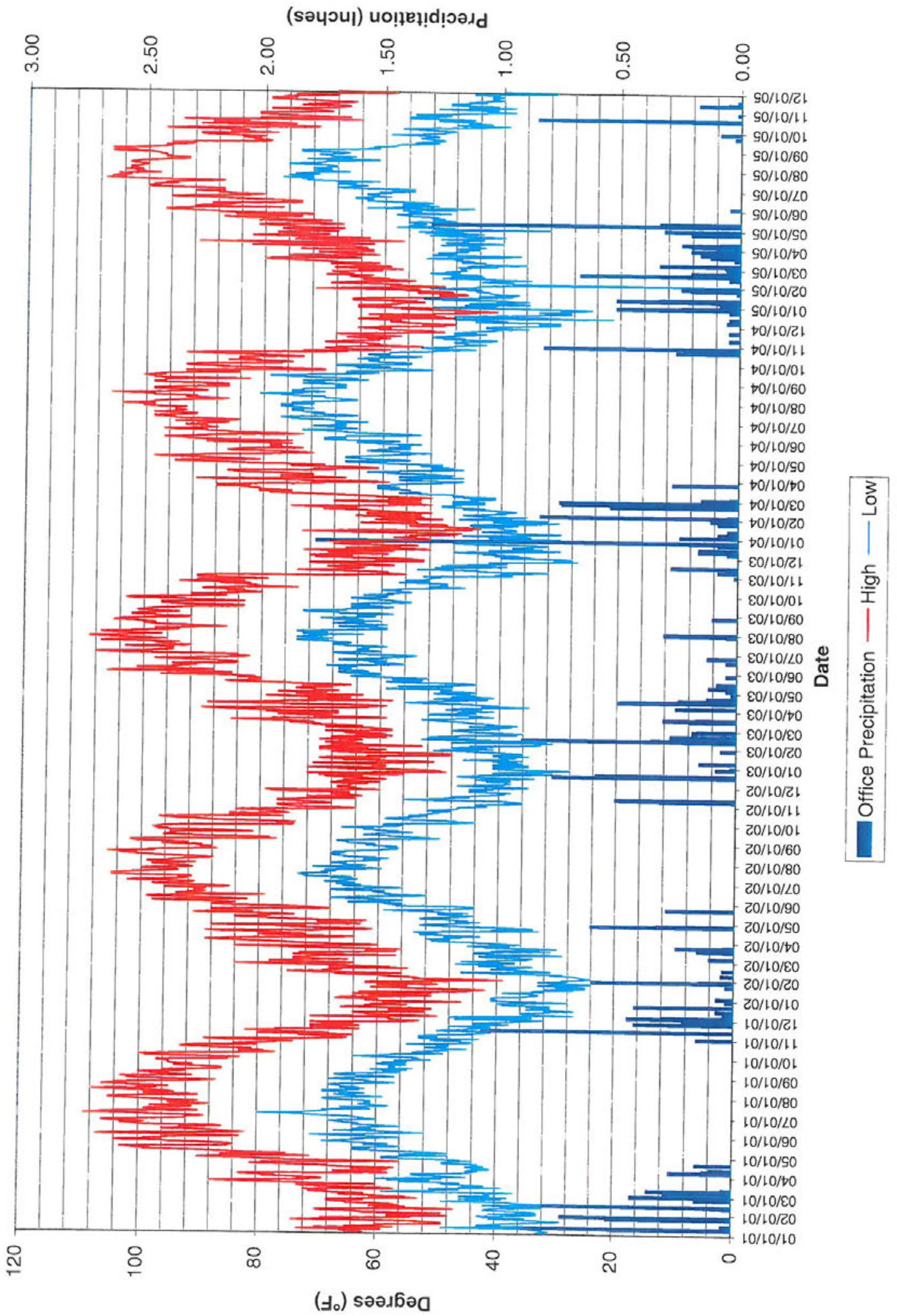
WIND	M.P.H.	DATE	TIME	DIRECTION
MAXIMUM WIND SPEED	12.3	12/31/05	3:00 PM	W
AVERAGE WIND SPEED	2.8			
AVERAGE WIND SPEED @ 8:00 AM	2.6			

BAROMETRIC PRESSURE	IN. HG	DATE	TIME
AVERAGE PRESSURE @ 8:00 AM	30.19		
MAXIMUM PRESSURE	30.49	12/04/05	10:00 AM
MINIMUM PRESSURE	29.95	12/02/05	2:00 PM

NOTES

- (1) 1975 to Present
- (2) 1968 to Present
- (3) 1967 to Present

Arvin-Edison Water Storage District Climatological Data (2001 - 2005)



		ARVIN-EDISON WATER STORAGE DISTRICT PRECIPITATION FOR DISTRICT OFFICE STATION												ARVIN-EDISON WATER STORAGE DISTRICT PRECIPITATION FOR DISTRICT OFFICE STATION (CUMULATIVE)													
OFFICE	SEASON	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL	SEASON	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
	1974-75	0.00	0.00	0.00	0.00	0.00	0.16	0.22	1.56	1.77	1.71	0.00	0.00	5.42	1974-75	0.00	0.00	0.00	0.00	0.00	0.16	0.38	1.94	3.71	5.42	5.42	5.42
	1975-76	0.00	0.19	0.06	1.02	0.16	0.25	0.15	1.12	0.42	1.05	0.32	0.06	4.80	1975-76	0.00	0.19	0.25	1.27	1.43	1.68	1.83	2.95	3.37	4.42	4.74	4.80
	1976-77	0.00	0.00	2.16	1.59	0.71	0.01	0.49	0.20	2.42	0.01	0.70	0.04	8.33	1976-77	0.00	0.00	2.16	3.75	4.46	4.47	4.96	5.16	7.58	7.59	8.29	8.33
	1977-78	0.00	0.88	0.03	0.00	0.12	1.93	1.20	5.00	3.71	1.02	0.05	0.00	13.94	1977-78	0.00	0.88	0.91	0.91	1.03	2.96	4.16	9.16	12.87	13.89	13.94	13.94
	1978-79	0.00	0.00	1.34	0.09	0.73	0.77	2.15	1.77	3.01	0.10	0.10	0.00	10.06	1978-79	0.00	0.00	1.34	1.43	2.16	2.93	5.08	6.85	9.86	9.96	10.06	10.06
	1979-80	0.00	0.00	0.11	1.29	0.27	0.21	3.00	0.90	1.88	1.83	0.20	0.00	9.69	1979-80	0.00	0.00	0.11	1.40	1.67	1.88	4.88	5.78	7.66	9.49	9.69	9.69
	1980-81	0.00	0.00	0.00	0.08	0.07	0.39	1.36	1.50	3.71	1.47	0.79	0.00	9.37	1980-81	0.00	0.00	0.00	0.08	0.15	0.54	1.90	3.40	7.11	8.58	9.37	9.37
	1981-82	0.00	0.00	0.00	0.81	0.60	0.13	1.56	0.61	2.20	1.44	0.00	0.75	8.10	1981-82	0.00	0.00	0.00	0.81	1.41	1.54	3.10	3.71	5.91	7.35	7.35	8.10
	1982-83	0.00	0.02	1.43	1.18	1.54	0.88	2.52	1.94	4.05	0.77	0.05	0.00	14.38	1982-83	0.00	0.02	1.45	2.63	4.17	5.05	7.57	9.51	13.56	14.33	14.38	14.38
	1983-84	0.00	1.02	0.16	0.91	2.38	1.22	0.08	0.32	0.85	1.15	0.00	0.11	8.20	1983-84	0.00	1.02	1.18	2.09	4.47	5.69	5.77	6.09	6.94	8.09	8.09	8.20
	1984-85	0.09	0.00	0.26	0.06	1.57	1.29	1.18	1.15	0.98	0.00	0.23	0.38	7.19	1984-85	0.09	0.09	0.35	0.41	1.98	3.27	4.45	5.60	6.58	6.58	6.81	7.19
	1985-86	0.03	0.00	0.60	0.82	2.67	0.34	1.01	0.79	2.01	0.58	0.12	0.00	8.97	1985-86	0.03	0.03	0.63	1.45	4.12	4.46	5.47	6.26	8.27	8.85	8.97	8.97
	1986-87	0.08	0.00	0.03	0.00	1.04	0.90	2.63	0.53	1.45	0.93	0.00	0.14	7.73	1986-87	0.08	0.08	0.11	0.11	1.15	2.05	4.68	5.21	6.66	7.59	7.59	7.73
	1987-88	0.00	0.00	0.06	0.76	4.15	1.52	1.64	0.31	0.18	1.65	0.75	0.31	11.33	1987-88	0.00	0.00	0.06	0.82	4.97	6.49	8.13	8.44	8.62	10.27	11.02	11.33
	1988-89	0.00	0.00	0.00	0.00	1.23	1.13	0.90	1.22	0.84	0.25	0.45	0.00	6.02	1988-89	0.00	0.00	0.00	0.00	1.23	2.36	3.26	4.48	5.32	5.57	6.02	6.02
	1989-90	0.00	0.00	0.28	0.28	0.05	0.00	2.19	1.56	0.36	0.28	0.83	0.00	5.83	1989-90	0.00	0.00	0.28	0.56	0.61	0.61	2.80	4.36	4.72	5.00	5.83	5.83
	1990-91	0.00	0.17	0.17	0.05	0.73	0.26	1.00	0.06	5.16	0.02	0.01	0.02	7.65	1990-91	0.00	0.17	0.34	0.39	1.12	1.38	2.38	2.44	7.60	7.62	7.63	7.65
	1991-92	0.00	0.00	0.00	1.16	0.04	1.15	1.81	2.35	2.02	0.29	0.15	0.00	8.77	1991-92	0.00	0.00	0.00	1.16	1.20	2.35	3.96	6.31	8.33	8.82	8.77	8.77
	1992-93	0.01	0.00	0.00	1.37	0.00	2.49	3.11	1.42	1.78	0.13	0.00	1.10	11.41	1992-93	0.01	0.01	0.01	1.38	1.38	3.87	6.98	8.40	10.18	10.31	10.31	11.41
	1993-94	0.00	0.00	0.00	0.04	0.55	1.27	0.84	1.44	0.60	1.07	0.45	0.00	6.26	1993-94	0.00	0.00	0.00	0.04	0.59	1.86	2.70	4.14	4.74	5.81	6.26	6.26
	1994-95	0.00	0.00	0.17	0.15	2.03	1.94	3.33	1.53	4.56	1.54	0.79	0.16	16.20	1994-95	0.00	0.00	0.17	0.32	2.35	4.29	7.62	9.15	13.71	15.25	16.04	16.20
	1995-96	0.00	0.00	0.00	0.00	0.04	1.79	1.18	3.80	0.63	0.20	0.20	0.00	7.84	1995-96	0.00	0.00	0.00	0.00	0.04	1.83	3.01	6.81	7.44	7.64	7.84	7.84
	1996-97	0.00	0.00	0.00	0.87	1.04	1.95	2.92	0.96	0.06	0.00	0.00	0.00	7.80	1996-97	0.00	0.00	0.00	0.87	1.91	3.86	6.78	7.74	7.80	7.80	7.80	7.80
	1997-98	0.00	0.00	0.15	0.05	1.61	0.43	1.96	5.22	4.85	3.03	1.15	0.26	18.71	1997-98	0.00	0.00	0.15	0.20	1.81	2.24	4.20	9.42	14.27	17.30	18.45	18.71
	1998-99	0.00	0.00	0.52	0.46	1.12	1.12	3.23	0.90	0.27	0.62	0.00	0.00	8.24	1998-99	0.00	0.00	0.52	0.98	2.10	3.22	6.45	7.35	7.82	8.24	8.24	8.24
	1999-00	0.00	0.00	0.00	0.00	0.69	0.09	1.18	2.46	1.42	0.60	0.05	0.07	6.56	1999-00	0.00	0.00	0.00	0.00	0.69	0.78	1.96	4.42	5.84	6.44	6.49	6.56
	2000-01	0.00	0.13	0.00	0.72	0.00	0.00	2.86	1.92	0.70	0.88	0.00	0.00	7.21	2000-01	0.00	0.13	0.13	0.85	0.85	0.85	3.71	5.63	6.33	7.21	7.21	7.21
	2001-02	0.00	0.00	0.00	0.15	1.72	1.28	0.83	0.10	0.57	0.92	0.28	0.00	5.85	2001-02	0.00	0.00	0.00	0.15	1.87	3.15	3.98	4.08	4.65	5.57	5.85	5.85
	2002-03	0.00	0.00	0.00	0.00	1.30	1.83	0.21	2.09	0.80	1.60	0.00	0.00	7.83	2002-03	0.00	0.00	0.00	0.00	1.30	3.13	3.34	5.43	6.23	7.83	7.83	7.83
	2003-04	0.64	0.10	0.00	0.01	0.40	2.41	0.70	3.66	0.45	0.00	0.00	0.00	8.37	2003-04	0.64	0.74	0.74	0.75	1.15	3.56	4.26	7.92	8.37	8.37	8.37	8.37
	2004-05	0.00	0.00	0.00	1.35	0.08	0.98	2.07	1.09	1.16	1.07	1.87	0.04	9.61	2004-05	0.00	0.00	0.00	1.35	1.43	2.31	4.38	5.47	6.63	7.70	9.57	9.61
	2005-06	0.00	0.00	0.10	1.06	0.29	1.85	0.86	0.12	2.36	1.57	0.06	0.00	8.27	2005-06	0.00	0.00	0.10	1.16	1.45	3.30	4.16	4.28	6.64	8.21	8.27	8.27
	Average (monthly)	0.03	0.08	0.24	0.51	0.90	1.00	1.57	1.55	1.79	0.87	0.30	0.11	8.94	Average (YTD)	0.03	0.11	0.34	0.85	1.76	2.75	4.32	5.87	7.66	8.53	8.83	8.94

* PRECIPITATION YEAR: JULY 1 THROUGH JUNE 30

ARVIN-EDISON WATER STORAGE DISTRICT PRECIPITATION RECORD FOR SYCAMORE STATION													ARVIN-EDISON WATER STORAGE DISTRICT PRECIPITATION RECORD FOR SYCAMORE STATION													
SYCAMORE SEASON	(CUMULATIVE)												TOTAL	(CUMULATIVE)												TOTAL
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN		JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
1967-68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.93	3.54	0.34	0.03	4.84	1966-67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.93	4.47	4.81	4.84
1968-69	0.00	0.00	0.00	2.18	1.21	1.43	2.87	4.19	2.19	1.24	0.05	0.01	15.37	1968-69	0.00	0.00	0.00	2.18	3.39	4.82	7.69	11.88	14.07	15.31	15.36	15.37
1969-70	0.00	0.00	0.00	0.00	0.75	0.56	0.85	0.98	1.47	0.35	0.00	0.00	4.96	1969-70	0.00	0.00	0.00	0.00	0.75	1.31	2.16	3.14	4.61	4.96	4.96	4.96
1970-71	0.01	0.00	0.00	0.00	2.54	1.78	1.02	0.48	0.34	0.66	1.07	0.00	7.90	1970-71	0.01	0.01	0.01	0.01	2.55	4.33	5.35	5.83	6.17	6.83	7.90	7.90
1971-72	0.00	0.17	0.02	0.11	0.71	1.28	0.00	0.07	0.00	0.13	0.00	0.11	2.60	1971-72	0.00	0.17	0.19	0.30	1.01	2.29	2.29	2.36	2.36	2.49	2.49	2.60
1972-73	0.00	0.01	0.03	1.87	1.20	1.85	2.23	0.83	2.83	0.06	0.11	0.06	11.08	1972-73	0.00	0.01	0.04	1.91	3.11	4.96	7.19	8.02	10.85	10.91	11.02	11.08
1973-74	0.00	0.00	0.00	0.21	1.50	1.44	1.10	1.14	1.41	0.89	0.11	0.00	6.80	1973-74	0.00	0.00	0.00	0.21	1.71	3.15	4.25	4.39	5.80	6.69	6.80	6.80
1974-75	0.09	0.00	0.00	1.16	0.51	0.89	0.17	1.41	1.50	1.77	0.00	0.00	7.50	1974-75	0.09	0.09	0.09	1.25	1.76	2.85	2.82	4.23	5.73	7.50	7.50	7.50
1975-76	0.00	0.16	0.06	0.95	0.10	0.27	0.15	1.14	0.42	1.11	0.33	0.04	4.73	1975-76	0.00	0.16	0.22	1.17	1.27	1.54	1.69	2.83	3.25	4.36	4.69	4.73
1976-77	0.00	0.00	2.09	2.19	0.81	0.01	0.50	0.10	2.37	0.00	0.70	0.01	8.78	1976-77	0.00	0.00	2.09	4.28	5.09	5.10	5.60	5.70	8.07	8.07	8.77	8.78
1977-78	0.00	0.85	0.02	0.00	0.11	1.81	1.17	4.92	3.35	0.85	0.03	0.00	13.11	1977-78	0.00	0.85	0.87	0.87	0.98	2.79	3.96	8.88	12.23	13.08	13.11	13.11
1978-79	0.00	0.00	1.23	0.02	0.54	0.80	2.00	1.72	2.86	0.02	0.11	0.00	9.30	1978-79	0.00	0.00	1.23	1.25	1.79	2.59	4.59	6.31	9.17	9.19	9.30	9.30
1979-80	0.00	0.00	0.04	1.27	0.27	0.21	2.88	0.87	1.71	1.61	0.17	0.00	9.03	1979-80	0.00	0.00	0.04	1.31	1.58	1.79	4.67	5.54	7.25	8.86	9.03	9.03
1980-81	0.00	0.00	0.00	0.03	0.08	0.35	1.26	1.35	3.47	1.38	0.62	0.00	8.54	1980-81	0.00	0.00	0.00	0.03	0.11	0.46	1.72	3.07	6.54	7.92	8.54	8.54
1981-82	0.00	0.00	0.00	0.96	0.56	0.41	1.42	0.55	2.13	1.52	0.00	0.56	8.11	1981-82	0.00	0.00	0.00	0.96	1.52	1.93	3.35	3.90	6.03	7.55	7.55	8.11
1982-83	0.00	0.02	1.44	1.11	1.38	0.85	2.38	1.98	3.90	0.54	0.03	0.00	13.53	1982-83	0.00	0.02	1.46	2.57	3.95	4.80	7.18	9.06	12.96	13.50	13.53	13.53
1983-84	0.00	1.16	0.15	0.91	2.23	1.16	2.08	0.31	0.84	1.00	0.00	0.10	7.94	1983-84	0.00	1.16	1.31	2.22	4.45	5.61	5.69	6.00	6.84	7.84	7.84	7.94
1984-85	0.06	0.00	0.25	0.04	1.54	1.20	1.25	1.10	1.01	0.02	0.22	0.38	7.07	1984-85	0.06	0.06	0.31	0.35	1.89	3.09	4.34	5.44	6.45	6.47	6.69	7.07
1985-86	0.00	0.00	0.58	0.70	2.52	0.34	0.78	0.80	2.05	0.57	0.12	0.00	8.46	1985-86	0.00	0.00	0.58	1.28	3.80	4.14	4.92	5.72	7.77	8.34	8.46	8.46
1986-87	0.02	0.00	0.04	0.00	1.08	0.80	2.50	0.58	1.46	0.79	0.00	0.15	7.42	1986-87	0.02	0.02	0.06	0.06	1.14	1.94	4.44	5.02	6.48	7.27	7.27	7.42
1987-88	0.00	0.00	0.05	0.74	4.02	1.33	1.69	0.25	0.16	1.63	0.82	0.31	11.00	1987-88	0.00	0.00	0.05	0.79	4.81	6.14	7.83	8.08	8.24	9.87	10.69	11.00
1988-89	0.00	0.00	0.00	0.00	1.20	0.91	0.85	1.25	0.84	0.24	0.45	0.00	5.74	1988-89	0.00	0.00	0.00	1.20	2.11	2.96	4.21	5.05	5.29	5.74	5.74	5.74
1989-90	0.00	0.00	0.25	0.30	0.05	0.00	2.20	1.23	0.33	0.27	0.83	0.00	5.46	1989-90	0.00	0.00	0.25	0.55	0.60	0.60	2.80	4.03	4.36	4.63	5.46	5.46
1990-91	0.00	0.17	0.11	0.08	0.82	0.19	0.82	0.05	5.14	0.02	0.00	0.02	7.42	1990-91	0.00	0.17	0.28	0.36	1.18	1.37	2.19	2.24	7.38	7.40	7.40	7.42
1991-92	0.00	0.00	0.00	1.16	0.04	1.10	1.56	2.35	2.21	0.29	0.15	0.00	8.86	1991-92	0.00	0.00	0.00	1.16	1.20	2.30	3.86	6.21	8.42	8.71	8.86	8.86
1992-93	0.01	0.00	0.00	1.24	0.00	2.32	3.19	1.24	1.59	0.00	0.00	1.08	10.67	1992-93	0.01	0.01	0.01	1.25	1.25	3.57	6.76	8.00	9.59	9.59	10.67	10.67
1993-94	0.00	0.00	0.00	0.04	0.58	1.27	0.98	1.44	0.60	1.12	0.48	0.00	6.51	1993-94	0.00	0.00	0.00	0.04	0.62	1.89	2.87	4.31	4.91	6.03	6.51	6.51
1994-95	0.00	0.00	0.16	0.01	1.80	1.99	2.98	1.37	4.11	1.28	0.63	0.14	14.47	1994-95	0.00	0.00	0.00	0.16	1.97	3.96	6.94	8.31	12.42	13.70	14.33	14.47
1995-96	0.00	0.00	0.00	0.00	0.05	1.73	1.07	3.68	0.56	0.15	0.16	0.00	7.40	1995-96	0.00	0.00	0.00	0.05	1.78	2.85	6.53	7.09	7.24	7.40	7.40	7.40
1996-97	0.00	0.00	0.00	0.90	1.03	1.77	2.80	0.95	0.05	0.00	0.00	0.00	7.50	1996-97	0.00	0.00	0.00	0.90	1.93	3.70	6.50	7.45	7.50	7.50	7.50	7.50
1997-98	0.00	0.00	0.12	0.04	1.61	0.41	1.86	0.95	4.57	3.02	1.10	0.22	17.90	1997-98	0.00	0.00	0.12	0.16	1.77	2.18	4.04	8.99	13.56	16.58	17.68	17.90
1998-99	0.00	0.00	0.52	0.48	1.01	0.96	3.09	0.91	0.23	0.62	0.00	0.00	7.82	1998-99	0.00	0.00	0.52	1.00	2.01	2.97	6.06	6.97	7.20	7.82	7.82	7.82
1999-00	0.00	0.00	0.00	0.00	0.65	0.09	1.16	2.34	1.31	0.62	0.05	0.04	6.26	1999-00	0.00	0.00	0.00	0.00	0.65	0.74	1.90	4.24	5.55	6.17	6.22	6.26
2000-01	0.00	0.12	0.00	0.71	0.00	0.00	2.76	1.88	0.69	0.92	0.00	0.00	7.08	2000-01	0.00	0.12	0.12	0.83	0.83	0.83	3.59	5.47	6.16	7.08	7.08	7.08
2001-02	0.00	0.00	0.00	0.14	1.67	1.22	0.80	0.09	0.63	0.85	0.31	0.00	5.71	2001-02	0.00	0.00	0.00	0.14	1.81	3.03	3.83	3.92	4.55	5.40	5.71	5.71
2002-03	0.00	0.00	0.00	0.00	1.27	1.77	0.16	1.99	0.79	1.55	0.00	0.00	7.53	2002-03	0.00	0.00	0.00	0.00	1.27	3.04	3.20	5.19	5.98	7.53	7.53	7.53
2003-04	0.00	0.15	0.00	0.01	0.40	2.39	0.64	3.21	0.44	0.00	0.00	0.00	7.24	2003-04	0.00	0.15	0.15	0.16	0.56	2.95	3.59	6.80	7.24	7.24	7.24	7.24
2004-05	0.00	0.00	0.00	1.27	0.07	0.89	2.12	1.13	1.19	1.12	1.72	0.04	9.55	2004-05	0.00	0.00	0.00	1.27	1.34	2.23	4.35	5.48	6.67	7.79	9.51	9.55
2005-06	0.00	0.00	0.10	1.04	0.27	1.75	0.91	0.12	2.26	1.50	0.03	0.00	7.98	2005-06	0.00	0.00	0.10	1.14	1.41	3.16	4.07	4.19	6.45	7.95	7.98	7.98
Average (monthly)	0.00	0.07	0.19	0.56	0.93	1.01	1.44	1.38	1.64	0.85	0.28	0.08	8.61	Average (YTD)	0.01	0.08	0.26	0.82	1.75	2.77	4.21	5.59	7.23	8.08	8.36	8.44

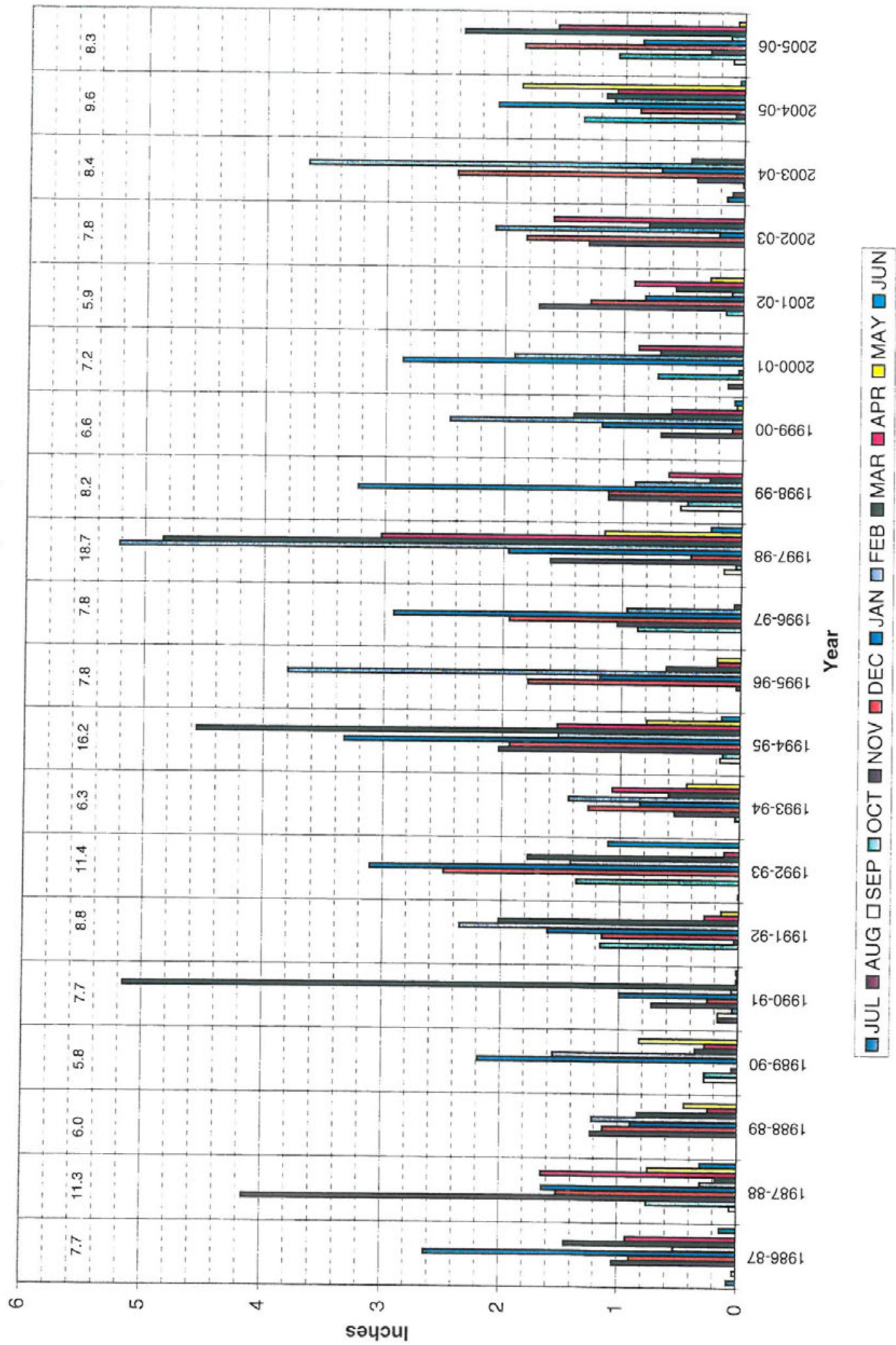
* PRECIPITATION YEAR: JULY 1 THROUGH JUNE 30

		ARVIN-EDISON WATER STORAGE DISTRICT PRECIPITATION RECORD FOR TEJON STATION												ARVIN-EDISON WATER STORAGE DISTRICT PRECIPITATION RECORD FOR TEJON STATION (CUMULATIVE)														
TEJON		JUL	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL	SEASON	JUL	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
SEASON		NA	NA	NA	NA	NA	NA	0.67	0.57	1.33	0.32	0.23	0.00	0.00	3.12	1967-68	NA	0.00	0.00	0.00	0.00	0.67	1.24	2.57	2.89	3.12	3.12	3.12
	1967-68	0.00	0.00	0.00	0.00	0.57	0.61	0.57	0.63	1.15	0.29	0.00	0.00	0.00	3.82	1969-70	0.00	0.00	0.00	0.00	0.57	1.18	1.75	2.38	3.53	3.82	3.82	3.82
	1969-70	0.00	0.00	0.00	0.00	2.19	1.09	0.71	0.14	0.29	0.94	1.03	0.00	0.00	6.39	1970-71	0.00	0.00	0.00	0.00	2.19	3.28	3.99	4.13	4.42	5.36	6.39	6.39
	1970-71	0.00	0.00	0.04	0.13	0.76	1.07	0.00	0.07	0.00	0.10	0.00	0.37	0.00	2.54	1971-72	0.00	0.00	0.04	0.17	0.93	2.00	2.00	2.07	2.07	2.17	2.17	2.54
	1971-72	0.00	0.00	0.04	0.70	0.93	1.73	1.95	1.00	2.95	0.19	0.07	0.07	0.00	9.63	1972-73	0.00	0.00	0.04	0.74	1.67	3.40	5.35	6.35	9.30	9.49	9.56	9.63
	1972-73	0.00	0.00	0.00	0.16	0.90	1.03	1.07	1.10	1.34	0.59	0.77	0.00	0.00	5.96	1973-74	0.00	0.00	0.00	0.16	1.06	2.09	3.16	3.26	4.60	5.19	5.96	5.96
	1973-74	0.00	0.00	0.00	1.54	0.65	0.92	0.06	1.46	1.32	1.91	0.00	0.00	0.00	7.86	1974-75	0.00	0.00	0.00	1.54	2.19	3.11	3.17	4.63	5.95	7.86	7.86	7.86
	1974-75	0.00	0.10	0.14	0.95	0.15	0.30	0.08	1.85	0.20	0.89	0.27	0.10	0.00	5.03	1975-76	0.00	0.10	0.24	1.19	1.34	1.64	1.72	3.57	3.77	4.66	4.93	5.03
	1975-76	0.00	0.00	1.31	1.79	0.71	0.01	0.42	0.08	2.55	0.00	1.47	0.00	0.00	8.34	1976-77	0.00	0.00	1.31	3.10	3.81	3.82	4.24	4.32	6.87	8.34	8.34	
	1976-77	0.00	0.78	0.00	0.00	0.12	1.92	1.13	4.24	3.19	1.01	0.04	0.00	0.00	12.43	1977-78	0.00	0.78	0.78	0.90	2.82	3.95	8.19	11.38	12.39	12.43	12.43	
	1977-78	0.00	0.00	1.16	0.03	0.20	0.53	1.70	1.37	1.59	0.09	0.25	0.00	0.00	6.92	1978-79	0.00	0.00	1.16	1.19	1.39	1.92	3.62	4.99	6.58	6.67	6.92	6.92
	1978-79	0.00	0.00	0.56	0.12	0.27	2.37	0.74	1.97	1.50	1.11	0.00	0.00	0.00	7.64	1979-80	0.00	0.00	0.00	0.56	0.68	0.95	3.32	4.06	6.03	7.53	7.64	7.64
	1979-80	0.00	0.00	0.00	0.03	0.00	0.50	1.01	0.88	4.08	1.11	1.29	0.00	0.00	8.90	1980-81	0.00	0.00	0.00	0.03	0.03	0.53	1.54	2.42	6.50	7.61	8.90	8.90
	1980-81	0.00	0.00	0.00	0.68	0.64	0.25	1.02	0.62	2.35	1.48	0.00	0.50	0.00	7.54	1981-82	0.00	0.00	0.00	0.68	1.32	1.57	2.59	3.21	5.56	7.04	7.04	7.54
	1981-82	0.00	0.06	1.48	0.81	0.90	0.56	2.06	3.31	0.44	0.18	0.00	0.00	0.00	11.88	1982-83	0.00	0.08	1.56	2.37	3.82	5.89	7.95	11.26	11.70	11.88	11.88	
	1982-83	0.00	0.66	0.10	1.58	2.34	0.95	0.05	0.09	0.64	0.92	0.00	0.05	0.00	7.38	1983-84	0.00	0.66	0.76	2.34	4.68	5.63	5.68	5.77	6.41	7.33	7.33	7.38
	1983-84	0.00	0.00	0.30	0.00	1.44	1.50	0.81	0.71	1.05	0.00	0.30	0.46	0.00	6.57	1984-85	0.00	0.00	0.30	0.30	1.74	3.24	4.05	4.76	5.81	5.81	6.11	6.57
	1984-85	0.00	0.00	0.60	0.42	2.22	0.23	0.60	0.60	1.88	0.44	0.00	0.00	0.00	6.99	1985-86	0.00	0.00	0.60	1.02	3.24	3.47	4.07	4.67	6.55	6.99	6.99	6.99
	1985-86	0.02	0.00	0.02	0.00	1.05	0.86	2.34	0.63	1.26	0.48	0.00	0.12	0.00	6.78	1986-87	0.02	0.02	0.04	0.04	1.09	1.95	4.29	4.92	6.18	6.66	6.66	6.78
	1986-87	0.00	0.00	0.00	0.71	3.36	1.32	1.40	0.20	0.22	1.31	0.37	0.23	0.00	9.12	1987-88	0.00	0.00	0.00	0.71	4.07	5.39	6.79	6.99	7.21	8.52	8.89	9.12
	1987-88	0.00	0.00	0.00	0.00	0.72	0.72	0.75	1.29	0.44	0.00	0.98	0.00	0.00	4.90	1988-89	0.00	0.00	0.00	0.00	0.72	1.44	2.19	3.48	3.92	3.92	4.90	4.90
	1988-89	0.00	0.00	0.33	0.22	0.00	0.00	1.74	1.04	0.27	0.34	0.57	0.00	0.00	4.51	1989-90	0.00	0.00	0.33	0.55	0.55	2.29	3.33	3.60	3.94	4.51	4.51	
	1989-90	0.00	0.00	0.08	0.08	0.62	0.14	1.00	0.08	3.75	0.06	0.00	0.00	0.00	5.81	1990-91	0.00	0.00	0.08	0.16	0.78	0.92	1.92	2.00	5.75	5.81	5.81	5.81
	1990-91	0.00	0.00	0.92	0.00	1.10	1.33	2.26	1.11	0.26	0.20	0.00	0.00	0.00	7.18	1991-92	0.00	0.00	0.00	0.92	0.92	2.02	3.35	5.61	6.72	6.98	7.18	7.18
	1991-92	0.04	0.00	0.00	0.82	0.00	1.96	3.18	0.81	1.31	0.00	0.00	1.34	0.00	9.46	1992-93	0.04	0.04	0.04	0.86	0.86	2.82	6.00	6.81	8.12	8.12	8.12	8.12
	1992-93	0.00	0.00	0.00	0.00	0.48	0.98	0.70	0.98	0.82	1.01	0.37	0.00	0.00	5.34	1993-94	0.00	0.00	0.00	0.48	1.46	2.16	3.14	3.96	4.97	5.34	5.34	
	1993-94	0.00	0.00	0.11	0.10	1.58	2.62	2.82	1.50	3.40	1.64	0.54	0.08	0.00	14.39	1994-95	0.00	0.00	0.11	0.21	1.79	4.41	7.23	8.73	12.13	13.77	14.31	14.39
	1994-95	0.00	0.00	0.00	0.00	0.07	0.86	1.15	3.04	0.54	0.13	0.12	0.00	0.00	5.91	1995-96	0.00	0.00	0.00	0.00	0.07	0.93	2.08	5.12	5.66	5.79	5.91	5.91
	1995-96	0.00	0.00	0.00	1.07	0.90	1.59	2.56	1.38	0.08	0.00	0.00	0.00	0.00	7.58	1996-97	0.00	0.00	0.00	1.07	1.97	3.56	6.12	7.50	7.58	7.58	7.58	7.58
	1996-97	0.00	0.00	0.10	0.05	1.18	0.45	1.79	4.21	3.44	1.62	1.22	0.05	0.00	14.11	1997-98	0.00	0.00	0.10	0.15	1.33	1.78	3.57	7.78	11.22	12.84	14.06	14.11
	1997-98	0.00	0.00	1.00	0.57	1.31	0.89	2.52	0.97	0.31	1.27	0.00	0.00	0.00	8.44	1998-99	0.00	0.00	1.00	1.57	2.88	3.77	6.29	6.86	7.17	8.44	8.44	8.44
	1998-99	0.00	0.00	0.00	0.00	0.57	0.04	1.04	1.97	1.28	0.50	0.03	0.05	0.00	5.48	1999-00	0.00	0.00	0.00	0.00	0.57	0.61	1.65	3.62	4.90	5.40	5.43	5.48
	1999-00	0.00	0.10	0.00	0.61	0.00	0.00	2.15	2.08	0.86	0.79	0.00	0.00	0.00	6.59	2000-01	0.00	0.10	0.10	0.71	0.71	0.71	2.86	4.94	5.80	6.59	6.59	6.59
	2000-01	0.00	0.00	0.00	0.26	1.52	1.48	0.75	0.18	0.61	0.78	0.20	0.00	0.00	5.78	2001-02	0.00	0.00	0.00	0.26	1.78	3.26	4.01	4.19	4.80	5.58	5.78	5.78
	2001-02	0.00	0.00	0.00	0.00	1.62	1.72	0.04	2.50	0.57	1.56	0.00	0.00	0.00	8.01	2002-03	0.00	0.00	0.00	0.00	1.62	3.34	3.38	5.88	6.45	8.01	8.01	8.01
	2002-03	0.00	0.00	0.00	0.01	0.36	2.35	0.75	3.14	0.31	0.00	0.00	0.00	0.00	6.98	2003-04	0.00	0.06	0.06	0.07	0.43	2.78	3.53	6.67	6.98	6.98	6.98	6.98
	2003-04	0.00	0.00	0.00	1.30	0.07	0.74	2.13	1.14	1.49	1.27	1.59	0.01	0.00	9.74	2004-05	0.00	0.00	0.00	1.30	1.37	2.11	4.24	5.38	6.87	8.14	9.73	9.74
	2004-05	0.00	0.00	0.11	1.06	0.24	1.23	0.79	0.06	1.62	0.95	0.11	0.00	0.00	6.17	2005-06	0.00	0.00	0.11	1.17	1.41	2.64	3.43	3.49	5.11	6.06	6.17	6.17
	2005-06	0.00	0.05	0.19	0.46	0.82	0.93	1.26	1.24	1.45	0.70	0.33	0.09	0.00	7.52	Average (YTD)	0.00	0.05	0.24	0.70	1.52	2.46	3.72	4.95	6.40	7.10	7.42	7.52
Average (monthly)														7.52														

* PRECIPITATION YEAR: JULY 1 THROUGH JUNE 30

Historical Precipitation Years District Office

Precipitation Year Cumulative Totals (Inches)

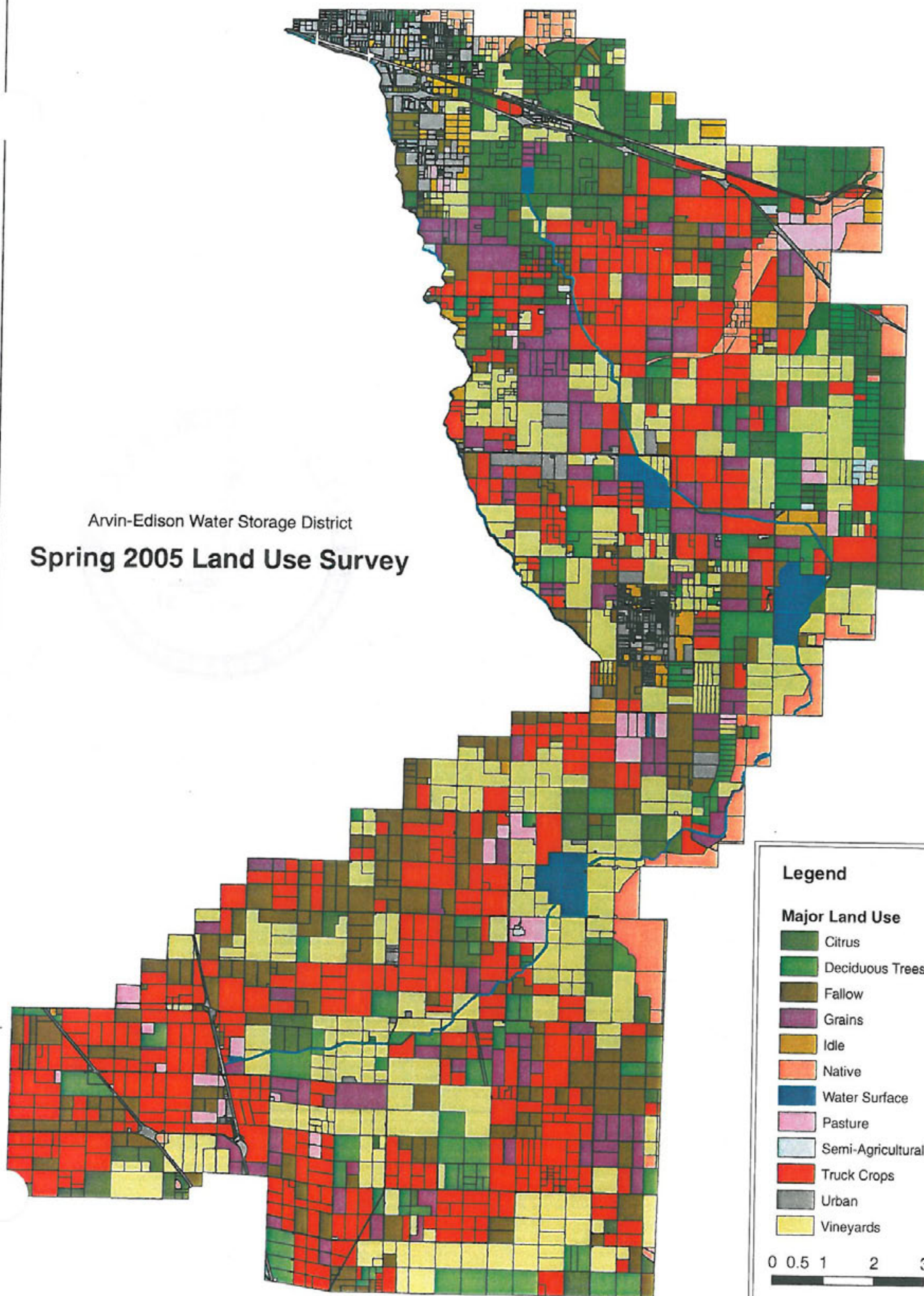


ATTACHMENT

M



Arvin-Edison Water Storage District
Spring 2005 Land Use Survey



Legend

Major Land Use

-  Citrus
-  Deciduous Trees
-  Fallow
-  Grains
-  Idle
-  Native
-  Water Surface
-  Pasture
-  Semi-Agricultural
-  Truck Crops
-  Urban
-  Vineyards

0 0.5 1 2 3
Miles

Arvin-Edison Water Storage District

Spring 2005 Crop Summary

Crop	Legend	Irrigation Method					Grand Total
		Drip	Gravity	Micro-Sprinkler	Sprinklers	Non-Irrigated	
AE Spillway	Spillway Basin					21	21
AEN	North Canal					264	264
AE-PP	AEWSD Pump Plants					11	11
AES	South Canal					301	301
C1	Grapefruit	134			40		174
C2	Lemons	82		41			123
C2-Y	Lemons-Young	42					42
C3	Oranges	1,920	515	9,857	38		12,330
C3-Y	Oranges-Young	56		123			179
C7	Miscellaneous Subtropical	148		1,365	20		1,533
C9	Jojoba	153					153
D1	Apples	117					117
D10	Misc. Deciduous	27			20		47
D12	Almonds	60	115	1,440	904		2,519
D12-Y	Almonds-Young		121	78			199
D13	Walnuts		139	446			585
D13-Y	Walnuts-Young			158			158
D14	Pistachios	90			78		168
D2	Apricots	43	74	73			190
D2-Y	Apricots-Young						-
D3	Cherries	636	31	1,144			1,811
D3-Y	Cherries	249		357			606
D5	Peaches/Nectarines	798	1,292	688			2,778
D5-Y	Peaches-Young	38	160	9			207
D6	Pears				10		10
D7	Plums	187	41				228
D7-Y	Plums	24					24
F	Fallow					8,362	8,362
F1	Cotton		99		2,999		3,098
F11	Miscellaneous Field				224		224
F2	Safflower				138		138
F6	Corn		999				999
G1	Barley					133	133
G2	Wheat		82		6,691		6,773
G3	Oats		79		1,995	9	2,083
G6	Grains & Hay				939	77	1,016
I	Idle					2,094	2,094
N	Native						-
NB	Native Barren					186	186
NCBR	North Canal Balancing Reservoir					79	79
NCSW	North Canal Spreading					346	346
NV1	Native Vegetation					4,302	4,302
NW	Native Waters					440	440
P1	Alfalfa		155		991		1,146
P2	Clover						-
P3	Mixed Pasture		430		81	316	827
P4	Native Pasture						-
P7	Turf Farms				278		278
S1	Semi-Agricultural			4		447	451
S2	Feedlots					131	131
S3	Dairies					28	28
SSW	Sycamore Spreading					606	606
T10	Onions		84		3,043		3,127
T12	Potatoes				16,150		16,150
T15	Tomatoes	178	1,921		115		2,214
T16	Nursery	188	21		236		445
T18	Misc. Truck	94	80	121	957		1,252
T19	Bush Berries	101					101
T2	Asparagus	105					105
T21	Peppers	1,250	519		153		1,922
T3	Beans						-
T6	Carrots				5,469		5,469
T8	Lettuce				272		272
T9	Melons	490	847		881		2,218
TSW	Tejon Spreading					615	615
UC	Urban Commercial					917	917
UI	Urban Industrial					2,125	2,125
UL	Urban Landscape						-
UR	Urban Residential					2,949	2,949
UV	Urban Vacant					3,695	3,695
V	Vineyards	16,679	9,135	1,032	1,519		28,365
V-A	Vineyards-Abandoned					251	251
V-Y	Vineyards-Young	785	96	69			950
Grand Total		24,674	17,035	17,005	44,241	28,705	131,660

Arvin-Edison Water Storage District
A 10 Year Summary Of Land Use (1968 - 1977)

LAND USE *(1) *(2) *(3)	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
Cotton	35,141	31,230	27,255	25,565	25,001	21,582	28,493	15,076	22,805	28,082
Potatoes	18,086	21,978	21,908	22,529	19,973	22,218	21,961	19,015	23,010	19,727
Alfalfa/Hay	1,455	1,728	2,184	2,887	2,711	2,514	2,685	3,066	3,707	4,816
Barley	10,678	7,084	7,123	3,872	2,997	2,832	664	390	632	738
Milo & Field Corn	2,213	334	667	1,340	232	136	329	0	0	0
Irrigated Pasture	62	228	200	195	202	217	147	184	440	372
Sugar Beets	2,727	2,857	2,815	2,457	2,381	2,221	794	2,441	2,162	1,259
Vineyards	14,138	14,496	14,873	17,899	21,107	25,290	26,183	26,649	24,453	24,069
Truck	10,686	9,818	9,444	10,855	11,504	14,628	12,182	17,275	12,348	14,941
Miscellaneous Field	562	1,384	1,820	720	1,577	314	38	1,402	326	142
Grain	1,416	4,152	3,588	3,942	4,053	3,514	4,229	10,710	6,928	1,673
Deciduous Orchard	4,115	3,859	4,800	4,595	4,905	6,022	7,909	8,404	8,936	8,836
Citrus	3,333	3,223	4,415	4,634	5,027	5,079	5,201	5,121	5,117	5,100
Subtotal	104,612	102,371	101,092	101,490	101,670	106,567	110,815	109,733	110,864	109,755
Fallow *(4)	4,133	5,581	4,882	7,437	5,237	2,252	908	2,058	1,728	2,347
Total Irrigated Acres	108,745	107,952	105,974	108,927	106,907	108,819	111,723	111,791	112,592	112,102
Roads, Houses, R.R., etc...	9,483	9,901	8,691	8,758	8,676	8,780	9,031	8,983	9,112	9,016
Semi-Incidental To Agricultural	186	553	977	988	1,000	955	948	945	811	890
Urban	2,583	1,935	2,454	2,254	2,299	2,322	2,313	2,349	2,359	2,381
Non-Irrigated Crops	1,234	801	2,258	1,635	2,024	1,150	698	863	995	711
Abandoned Orchards/Vineyards	11	0	43	26	26	0	0	0	0	0
Idle Land *(5)	590	2,317	2,258	1,548	4,840	2,127	1,182	1,103	1,119	1,672
Dry Native Pasture	7,156	7,133	7,613	6,750	5,830	7,507	5,589	5,626	4,672	4,888
Total Non-Irrigated Acres	21,243	22,640	24,294	21,959	24,695	22,841	19,761	19,869	19,068	19,558
Total District Acreage	129,988	130,592	130,268	130,886	131,602	131,660	131,484	131,660	131,660	131,660

- *(1) Standard Land Use Legend as prepared by DWR, January 1981
- *(2) Land Use is surveyed during the Spring of each year
- *(3) Land Use survey completed in July
- *(4) Land cropped within the last 3 years but not tilled at time of survey
- *(5) Land not cropped within the past three years but tilled at some time

Arvin-Edison Water Storage District
A 10 Year Summary Of Land Use (1978 - 1987)

LAND USE *(1) *(2) *(3)	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Cotton	25,495	21,350	25,696	23,276	18,450	11,987	16,706	13,438	12,881	14,940
Potatoes	19,265	20,138	16,521	20,301	18,822	18,327	18,839	20,804	15,278	16,376
Alfalfa/Hay	3,202	2,787	3,826	4,192	4,055	3,070	3,505	3,454	3,396	2,195
Barley	1,252	693	960	485	832	236	756	444	41	544
Milo & Field Corn	0	71	0	231	32	0	0	109	41	29
Irrigated Pasture	415	111	105	263	92	193	193	118	137	86
Sugar Beets	1,134	1,018	1,245	1,654	376	216	259	288	409	392
Vineyards	24,128	25,838	27,515	28,346	29,438	29,936	29,975	27,446	24,483	23,361
Truck	16,329	18,293	14,374	12,905	16,407	14,804	13,920	12,936	10,897	12,806
Miscellaneous Field	269	182	6	0	53	116	185	221	255	143
Grain	1,277	2,455	5,380	3,902	4,477	4,085	4,308	2,881	3,572	2,030
Deciduous Orchard	8,513	8,338	9,530	10,926	11,088	11,598	11,456	11,038	10,906	10,943
Citrus	4,645	4,780	4,775	4,834	4,551	5,101	5,520	6,074	6,238	7,232
Subtotal	105,924	106,054	109,933	111,315	108,673	99,669	105,622	99,251	88,534	91,077
Fallow *(4)	5,674	4,952	683	285	3,215	11,133	2,127	8,996	12,144	7,405
Total Irrigated Acres	111,598	111,006	110,616	111,600	111,888	110,802	107,749	108,247	100,678	98,482
Roads, Houses, R.R., etc...	8,962	8,976	8,945	9,052	9,034	8,995	8,807	8,844	8,446	8,335
Semi-Incidental To Agricultural	895	883	835	843	809	807	807	836	831	834
Urban	2,562	2,443	2,537	2,605	2,582	2,778	2,768	3,000	3,104	3,130
Non-Irrigated Crops	1,070	254	540	0	31	92	674	172	642	1,012
Abandoned Orchards/Vineyards	0	0	0	0	0	0	0	0	2,299	1,621
Idle Land *(5)	2,312	3,220	3,607	2,407	2,562	3,561	5,047	4,133	10,151	12,349
Dry Native Pasture	4,261	4,878	4,580	5,153	4,754	4,625	5,808	6,428	5,509	5,897
Total Non-Irrigated Acres	20,062	20,654	21,044	20,060	19,772	20,858	23,911	23,413	30,982	33,178
Total District Acreage	131,660	131,660	131,660	131,660	131,660	131,660	131,660	131,660	131,660	131,660

- *(1) Standard Land Use Legend as prepared by DWR, January 1981
 *(2) Land Use is surveyed during the Spring of each year
 *(3) Land Use survey completed in July
 *(4) Land cropped within the last 3 years but not tilled at time of survey
 *(5) Land not cropped within the past three years but tilled at some time

Arvin-Edison Water Storage District
A 10 Year Summary Of Land Use (1988 - 1997)

LAND USE *(1) *(2) *(3)	1988	1989	1990	1991	1992	1993	1994	1995 *(3)	1996	1997
Cotton	19,776	14,828	17,579	11,188	14,100	12,619	12,171	14,176	15,535	12,974
Potatoes	14,578	15,695	18,909	16,433	15,166	16,383	16,379	15,302	19,224	15,728
Alfalfa/Hay	2,148	2,515	3,643	2,969	1,904	1,934	2,328	3,005	2,694	3,299
Barley	304	121	0	283	1,000	871	970	467	246	0
Milo & Field Corn	0	0	138	88	76	96	0	103	354	410
Irrigated Pasture	320	592	22	190	13	13	238	24	250	97
Sugar Beets	416	266	536	458	330	115	38	0	0	0
Vineyards	22,721	22,446	22,445	23,386	22,798	22,835	23,157	25,251	26,913	27,928
Truck	12,202	12,495	11,549	16,972	12,914	14,497	14,036	15,673	16,701	12,660
Miscellaneous Field	38	9	99	0	0	558	411	0	0	130
Grain	2,353	3,610	2,541	2,060	2,971	3,014	2,791	4,591	5,371	4,871
Deciduous Orchard	11,343	11,628	10,561	10,865	11,143	10,959	11,106	11,678	11,515	11,786
Citrus	7,755	8,615	9,934	10,479	10,806	11,657	11,805	12,430	12,504	13,223
Subtotal	93,954	92,820	97,956	95,371	93,221	95,551	95,430	102,700	111,307	103,106
Fallow *(4)	6,451	7,119	5,736	2,201	3,962	7,236	7,290	7,544	5,062	11,151
Total Irrigated Acres	100,405	99,939	103,692	97,572	97,183	102,787	102,720	110,244	116,369	114,257
Roads, Houses, R.R., etc...	8,442	8,443	8,723	8,289	8,391	8,646	8,640	2,800	2,735	3,427
Semi-Incidental To Agricultural	892	884	1,721	1,776	1,921	1,813	1,722	2,003	1,697	1,955
Urban	3,090	3,296	3,650	3,489	3,529	3,697	3,778	4,250	3,891	4,318
Non-Irrigated Crops	637	1,609	0	765	1,525	4,606	3,951	3,668	2,972	586
Abandoned Orchards/Vineyards	596	125	0	299	60	0	0	0	0	77
Idle Land *(5)	11,661	11,239	3,526	12,308	10,575	2,431	3,459	1,732	66	284
Dry Native Pasture	5,937	6,125	10,348	7,162	8,476	7,680	7,390	6,963	3,930	6,756
Total Non-Irrigated Acres	31,255	31,721	27,968	34,088	34,477	28,873	28,940	21,416	15,291	17,403
Total District Acreage	131,660	131,660	131,660	131,660	131,660	131,660	131,660	131,660	131,660	131,660

*(1) Standard Land Use Legend as prepared by DWR, January 1981

*(2) Land Use is surveyed during the Spring of each year

*(3) Land Use survey completed in July

*(4) Land is tilled at time of survey but current crop not identified

*(5) Land cropped within the past three years but not tilled at time of survey

ARVIN-EDISON WATER STORAGE DISTRICT
AN 8 YEAR SUMMARY OF LAND USE (1998 - 2005)

LAND USE *(1) *(2)	1998	1999	2000	2001	2002	2003	2004	2005
Field Crops								
Cotton	7,764	6,660	7,132	8,661	5,771	4,919	5,053	3,098
Milo & Field Corn	709	371	97	373	578	785	753	999
Other Field Crops	217	842	1,264	1,981	60	40	40	362
Truck Crops								
Potatoes	19,808	13,356	16,111	16,423	19,788	14,800	14,630	16,150
Other Truck Crops	13,692	15,521	14,504	14,624	15,580	17,651	17,575	17,125
Grain & Hay Crops	6,791	11,060	10,096	8,992	7,228	11,423	10,947	9,786
Pasture	2,142	2,552	2,394	1,825	1,484	2,517	2,113	1,973
Vineyards	28,447	29,784	29,783	29,886	30,081	29,071	28,686	29,566
Deciduous Orchard	11,799	11,799	10,339	10,812	10,705	9,410	9,075	9,800
Citrus	13,477	14,416	14,186	14,274	14,172	14,462	14,545	14,381
Subtotal	104,846	106,361	105,906	107,851	105,447	105,078	103,417	103,240
Fallow *(4)	4,384	7,226	7,622	5,496	7,764	7,944	9,242	8,362
Total Irrigated Acres	109,230	113,587	113,528	113,347	113,211	113,022	112,659	111,602
Semi-Incidental To Agricultural								
Urban	1,791	1,126	1,326	1,474	1,474	1,474	1,930	610
Non-Irrigated Crops	9,503	7,260	7,119	7,153	7,153	7,183	6,996	9,713
Abandoned Orchards/Vineyards	4,738	1,172	652	507	671	570	502	219
Idle Land *(5)	26	26	26	26	27	681	251	251
Native Classes	256	316	226	319	333	671	1,558	2,094
Total Non-Irrigated Acres	6,116	8,173	8,783	8,834	8,791	8,059	7,764	7,171
Total District Acreage	22,430	18,073	18,132	18,313	18,449	18,638	19,001	20,058
Total District Acreage	131,660	131,660	131,660	131,660	131,660	131,660	131,660	131,660

*(1) Standard Land Use Legend as prepared by DWR, July 1993

*(2) Land Use is surveyed during the Spring of each year

*(3) Land Use survey completed in July

*(4) Land is tilled at time of survey but current crop not identified

*(5) Land cropped within the past three years but not tilled at time of survey

ATTACHMENT

N

JMLord
incorporated

*agricultural scientists
consulting engineers*

ARVIN-EDISON WATER STORAGE DISTRICT

**ASSESSMENT OF
REASONABLE WATER REQUIREMENTS**

Water Years

2003-2004

2004-2005

2005-2006

March 2006

irrigation scheduling & fertility monitoring
micro irrigation design & development
engineering & agronomy studies
irrigation & drainage designs
water needs assessment
soil & water evaluations
laboratory services



ARVIN-EDISON WATER STORAGE DISTRICT

ASSESSMENT OF REASONABLE WATER REQUIREMENTS

Water Years

2003-2004

2004-2005

2005-2006

Prepared For:



ARVIN-EDISON WATER STORAGE DISTRICT

20401 Bear Mountain Boulevard
Post Office Box 175
Arvin, California 93203

Prepared By:



JMLord, Inc.

Agricultural Scientists
Consulting Engineers

March 2006

TABLE OF CONTENTS

	Page
I. Introduction	5
II. Effective Precipitation	5
III. Electro-Conductivity of Water (ECw)	7
IV. Crop Evapotranspiration (ETc)	8
V. Crop Leaching	18
VI. Summary Analysis	25
VII. Appendix 1 (Historical Data)	37

FIGURES

		Page
1.	Arvin-Edison Water Storage District Boundary Map	4
2.	Generalized Crop Coefficients (Kc) and Growth Stages	10
3.	Leaching Percent for Years 99-00 through 2005-06	29
4.	Total District Water Requirement	30
5.	Total Irrigation Requirement vs. Total Water Supply.....	31
6.	Total Water Distribution.....	32
7.	Trend Lines	34

TABLES

		Page
1.	Utilizable Precipitation	6
2.	Water Quality Measurements	7
3.	Summary of Reference Evapotranspiration (ET _o) in the AEWSD for Water Delivery Years 2003-04 through 2005-06	9
4.	Description of Crop Coefficients (Kc) and Crop Growth Stages	10
5.	Calculated Evapotranspiration Demand (ET _c) for Various Crops Grown in the AEWSD for Water Delivery Years 2003-04 through 2005-06	12
6.	Irrigated Acreage of Various Crops Grown in the AEWSD for Water Delivery Years 2003-04 through 2005-06	14
7.	Total ET _c Demand of Various Crops Grown in the AEWSD for Water Delivery Years 2003-04 through 2005-06	16
8.	Crop Salinity Thresholds for Various Crops Grown in the AEWSD	20
9.	Leaching Requirement (LR) for Various Crops Grown in the AEWSD for Water Delivery Years 2003-04 through 2005-06	21
10.	Total of ET _c and LR Demand for Crops Grown in the AEWSD for Water Delivery Years 2003-04 through 2005-06	23
11.	Summary of Water Supplies within the AEWSD for Water Delivery Years 1994-95 through 2005-06	26
12.	Summary of Water Demands within the AEWSD for Water Delivery Years 1994-95 through 2005-06	27
13.	Summary of Reasonable Water Requirements for the AEWSD for Water Delivery Years 1994-95 through 2005-06	28

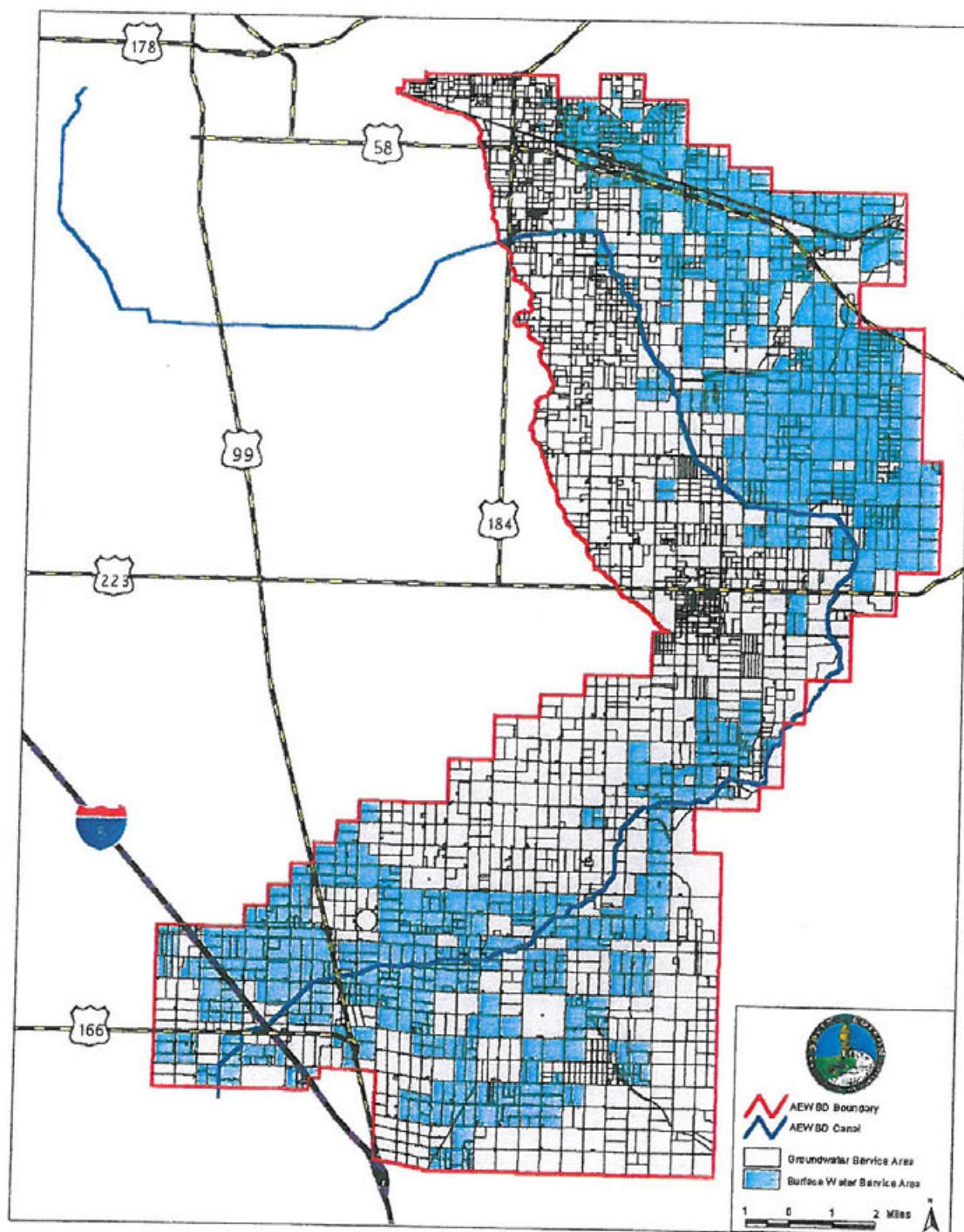


Figure 1. Arvin-Edison Water Storage District Boundary Map

ARVIN-EDISON WATER STORAGE DISTRICT

ASSESSMENT OF REASONABLE WATER REQUIREMENTS

2003-2004 IRRIGATION SEASON

2004-2005 IRRIGATION SEASON

2005-2006 IRRIGATION SEASON

I. INTRODUCTION

The following data on crop water requirements for the Arvin-Edison Water Storage District (AEWSD or District) during water years¹ for 2003-2004, 2004-2005, and 2005-2006 were calculated based on the considerations and procedures outlined herein. Data from years 1994-1995 through 2002-2003 as calculated previously are provided as historical reference in Appendix 1. The approach of using a calibrated ET model and real time climatic data to determine water use is widely accepted and commonly applied. The following water needs assessment is predicated on the procedures developed in that approach

II. EFFECTIVE PRECIPITATION

Rainfall varies considerable from year to year as well as within years in the District region, and only a portion of the total precipitation contributes to crop evapotranspiration. The effective precipitation reported in this analysis was determined using the same formula applied by the United States Bureau of Reclamation (USBR) for preparation of annual water supply reports for water districts/users within the Central Valley Project (CVP) Friant Division (personal communication with USBR, Fresno, California office). The formula for effective precipitation is:

$$\text{Effective Precipitation} = \frac{0.8 \times (\text{Annual Rainfall} - 4)}{12} - 0.07$$

The annual rainfall amount in the equation is reported as inches and the divisor (12) converts the result into feet. The effective precipitation is then multiplied by net cropped acres (i.e., actual acres not including double crops) to determine the total acre-feet of utilizable precipitation for the entire District.

¹ Water Year = March through February

Rainfall amounts are recorded within the District at four separate locations (CIMIS Station #125 (Arvin-Edison)², Sycamore, Tejon, and District Office weather stations). Using the average rainfall totals between the four stations and the net cropped acreage within the District each year, the utilizable annual precipitation was estimated as shown below in Table 1.

Table 1. Utilizable Precipitation

Year	Average Rainfall (in) 1	Effective Precipitation (ac-ft/ac) 2	Total Irrigated (acres) 3	Utilizable Precipitation (ac-ft) 4	Effective Rainfall (%) 5
1994-95	10.90	0.390	103,656	40,449	42.9
1995-96	12.44	0.493	110,244	54,338	47.5
1996-97	8.46	0.227	111,147	25,267	32.2
1997-98	8.79	0.250	112,789	28,147	34.1
1998-99	15.24	0.679	109,278	74,212	53.5
1999-00	5.20	0.010	106,620	1,066	2.3
2000-01	7.35	0.154	105,906	16,262	25.1
2001-02	5.68	0.042	107,687	4,499	8.8
2002-03	7.22	0.144	105,733	15,273	24.0
2003-04	9.42	0.291	104,610	30,476	37.1
2004-05	5.85	0.054	103,038	5,518	11.0
2005-06	8.18	0.208	102,955	21,460	30.6

- 1 Averaged from weather stations
- 2 Calculated effective participation
- 3 Total cropped acres
- 4 Utilizable Precipitation = (2) * (3)
- 5 Effective Rainfall (%) = (2) / [(1)/12] * 100

The amount of utilizable precipitation (column 4) in each year was subtracted from estimates of ETc + LR (Table 8) to determine the net irrigation requirement of the District.

² CIMIS Station #125 (Arvin-Edison) data starts in 1996-97 water year

III. ELECTRO-CONDUCTIVITY OF WATER (EC_w)

Water quality measurements are compiled monthly at three locations along the District canal system. These measurements provide a good indication of the salinity of the water, which is delivered for irrigation use throughout the crop season. Table 2 below presents the information for years 2003 through 2005. Appendix 1 (Table 1) presents historical water quality data.

Table 2.³ Water Quality Measurements

Water Source	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg
EC _w in micromhos/cm													
2003 Intake	353	46		386	47	46	270	330	149	40	45	562	207
North	404	191	273	293	50	39	34	390	167	69	43	519	206
South	379	279	375	341	50	40	33	360	156	41	47		191
	micromhos/cm =												201
	dS/m =												0.201
	weighted ⁴ dS/m =												0.167
2004 Intake	51	45	53	183	464	320	388	183	464	320	388	278	261
North	321	44	48	260	280	323	327	260	280	323	327	296	257
South	304	46	47	291	332	345	349	291	332	345	349	317	279
	micromhos/cm =												266
	dS/m =												0.266
	weighted ⁴ dS/m =												0.251
2005 Intake	45	43	43	49	39	24	28	31	52	31	400	54	70
North	44	45	48	46	40	24	32	34	50	42	400	75	73
South	46	43	49	48	41	24	86	39	61	32	410	62	78
	micromhos/cm =												74
	dS/m =												0.074
	weighted ⁴ dS/m =												0.080

³ Water Year = March through February

⁴ Weighted Sum based on Water Year

IV. CROP EVAPOTRANSPIRATION (ET_c)

The process of evapotranspiration (ET) depends upon climatic factors as well as the internal condition of the cropped field itself. If the internal conditions in a field are kept at an optimum (i.e., non-stressed growing conditions), then the ET rate is assumed to depend solely upon the meteorological regime. The concept of reference or potential evapotranspiration attempts to characterize the climatic environment in terms of its evaporative power (i.e., the maximum evaporation rate that the atmosphere is capable of extracting from a well-watered field under a given condition). Thus, the reference ET expresses the climatically imposed evaporative demand (Hillel, 1990).

Several climatic models have been developed to define reference ET and its relationship to crop water use. Most of these are reviewed by Doorenbos and Pruitt (1977) and Hatfield (1990). These models utilize either a grass crop (ET_o), and alfalfa crop (ET_p), or open water (ET_{pan}) as the reference component (ET_r). Using a calculated reference ET value based on climatic variables, it is possible to account for the effects of specific crop characteristics and other internal field factors on crop water requirements using an empirical crop coefficient (K_c). The K_c is derived from the following formula:

$$K_c = \frac{ET_c}{ET_r}$$

Where,

K _c	=	the crop coefficient for a particular stage of growth
ET _c	=	the evaporative demand of the crop
ET _r	=	the evaporative demand of a reference component (e.g., grass, alfalfa, or open water)

K_c values vary widely among crops as well as between different growth stages for particular crops. Values for K_c's are generally derived under carefully controlled growing conditions and are reported in various literature sources (Doorenbos and Pruitt, 1977; Snyder et al., 1989 a, b). It is important to note that K_c values are dependent upon which reference ET component (i.e., ET_o, ET_p, or ET_{pan}) is utilized to estimate the climatic evaporative demand.

By rearranging the above equation, the relationship between the ET_r and ET_c may be described as,

$$ET_c = K_c \times ET_r$$

Thus, the evapotranspiration demand of a crop (ETc) at any time during the growing season may be estimated through determination of an ETr (e.g., ETo) value and application of an appropriate Kc value.

The daily rate of actual ETc will seldom equal the ETr. Crop canopy characteristics, stand density, stage of growth, the degree of surface cover, and the soil moisture regime all affect the actual ET demand by the crop. In the case of annual crops, the seasonal total ETc will usually not equal the total ETr for the same period. Early in the season, during germination and stand-establishment, the rate of ETc is generally small. Later, the ET demand of the fully developed crop canopy may actually exceed the reference ET and then, as the crop matures, the actual ETc will again fall below ETr.

Crop water requirements are defined in this report as the depth of water required to meet the water loss through ETc (as defined above). It is assumed that the ETc demand is representative of a disease-free crop, growing in a field without restrictive soil conditions, and achieving full-production potential under the given environment. ETr is based on a grass crop and is defined in this analysis as ETo.

Reference ETo values were obtained from the California Irrigation Management Information System (CIMIS) network and are representative of the normal year ETo (inches/year). Table 3 provides the information for years 2003-04 through 2005-06. Appendix 1 (Table 2) provides the information for previous years.

Table 3. Summary of Reference Evapotranspiration (ETo) in the AEWSD for Water Delivery Years 2003-04 through 2005-06

Month	2003-04	2004-05	2005-06
	Inches		
March	4.15	4.73	3.28
April	4.88	6.57	5.20
May	7.10	8.33	6.99
June	8.51	9.03	8.07
July	8.74	9.53	9.63
August	7.83	8.74	9.15
September	6.27	6.56	5.86
October	4.71	3.76	3.95
November	1.92	1.87	2.37
December	1.55	1.49	1.36
January	1.09	1.16	1.82
February	2.17	1.92	2.71
Total	58.92	63.69	60.39

Kc values for individual crops were determined on a monthly basis for separate and identified stages of growth. The basic crop growth stages are schematically presented in Figure 2 and described in Table 4.

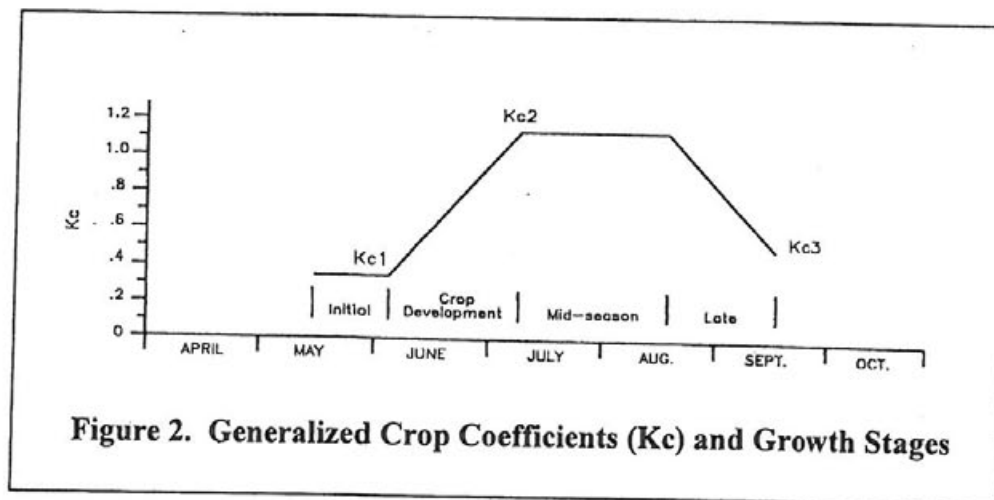


Table 4. Description of Crop Coefficients (Kc) and Crop Growth Stages

Kc Value	Growth Stage	Description
Kc1	Initial	The average Kc value from planting to 10% cover
Kc1 to Kc2 (positive slope)	Crop development	From 10% cover to about 75% cover or peak water use (whichever occurs first). In orchards/grapes from leaf out to full cover.
Kc2 (zero slope)	Mid-season	From attainment of full cover to the initiation of maturation or until water use begins to decline due to aging.
Kc2 to Kc3 (negative slope)	Late season	From the beginning of Kc decline until harvest or water use ceases or becomes minimum.
Kc3	Harvest	The average value at harvest at the end of the water use season.

NOTE: For deciduous tree crops grown with no cover crop, Kc2 corresponds to approximately 60% to 70% ground shading and Kc3 to leaf drop (mature trees only).

Once the average Kc values for each month (or partial month) were determined, they were multiplied times the reference ETo value for that month (in that particular year). The resulting monthly crop ET values were then summed to estimate the water requirement of the crop for the entire growing season. This value (i.e., ETc) represents the net amount of water required to satisfy the ET demand of the crop.

Estimates of the ETc (acre-feet/acre) for various crops produced in the Arvin-Edison Water Storage District for years 2003-04 through 2005-06 are presented in Table 5. Estimates of ETc for previous years are presented in Appendix 1 (Table 3 and 3A). In addition, irrigated acres of each crop grown and the corresponding net ETc demand (total acre-feet) are presented in Tables 6 and 7, respectively for the years 2003-04 through 2005-06. Appendix 1 (Tables 4, 4A, 5 and 5A) provide the same data for previous years. Acreage values were obtained from crop census reports, which are compiled by the District.

Table 5. Calculated Evapotranspiration Demand (ETc) for Various Crops Grown in the AEWS for Water Delivery Years 2003-04 through 2005-06

Crop	2003-04	2004-05	2005-06
	Acre-feet / Acre		
Alfalfa	3.78	4.21	3.83
Almonds	3.28	3.61	3.29
Almonds, Young	3.28	3.61	3.28
Apples	3.89	4.23	3.95
Apricots	3.28	3.61	3.29
Apricots, Young	0.06	3.55	
Artichokes			
Asparagus		0.06	4.00
Barley	0.15	2.02	1.53
Beans (green)	1.37	1.54	
Broccoli (Fall)			0.48
Broccoli (Spring)			
Bushberries	3.64		3.73
Cabbage (Fall)			
Cabbage (Spring)			
Carrots (Fall)	1.29	1.27	1.27
Carrots (Spring)	1.52	1.78	1.47
Cauliflower (Fall)			
Cauliflower (Spring)			
Cherries	3.89	4.23	3.95
Cherries, Young	3.89	4.23	3.95
Clover	0.18	4.92	
Corn	2.42	2.66	2.56
Cotton	2.75	2.52	2.77
Fallow	0.18	4.92	
Flowers & Nursery	1.96	2.12	1.93
Grapefruit	2.70	2.92	2.66
Grapefruit, Young			
Joboba	2.55	0.14	2.63
Lemons	3.19	3.45	3.07
Lemons, Young		0.17	3.03
Lettuce (Fall)	1.01	1.00	0.96
Lettuce (Spring)	0.26	0.75	0.71
Melons, cucumbers, squash (all types)	1.75	1.92	1.81
Misc. Deciduous	3.20	3.51	3.23
Misc. Field			3.05

**Table 5. Calculated Evapotranspiration Demand (ETc) for Various Crops
Grown in the AEWSD for Water Delivery Years 2003-04 through 2005-06
(Continued)**

Crop	2003-04	2004-05	2005-06
	Acre-feet / Acre		
Misc. Hay & Grain	0.15	2.02	1.73
Misc. Subtropical Fruits		0.14	2.56
Misc. Subtropical Fruits, Young			
Misc. Truck/Berry	3.64	4.01	3.73
Mixed Pasture	4.69	5.08	4.58
Native Pasture			
Oats		0.14	1.73
Onions & Garlic	0.39	2.42	2.17
Oranges	3.19	3.45	3.14
Oranges, Young	3.19	3.45	3.14
Peaches & Nectarines	3.20	3.51	3.23
Peaches & Nectarines, Young	3.20	3.51	3.23
Pears			3.23
Peppers (all types)	1.97	2.21	1.98
Pistachios	3.43	3.73	3.47
Plums	3.20	3.51	3.23
Plums, Young	3.20		3.22
Potatoes	1.58	1.87	1.51
Safflower	2.25	2.57	2.21
Sunflowers			
Sweet Potatoes			
Tomatoes	2.05	2.27	2.09
Tree Farm			
Turf Farm	3.92	4.26	3.74
Vineyards	2.05	2.30	2.12
Vineyards, Young	2.05	2.30	2.12
Walnuts	3.39	3.64	3.44
Walnuts, Young			3.44
Wheat	0.15	2.02	1.73

**Table 6. Irrigated Acreage of Various Crops Grown in the AEWSO
for Water Delivery Years 2003-04 through 2005-06**

Crop	2003-04	2004-05	2005-06
	Acres		
Alfalfa	1951	1567	1146
Almonds	2387	1989	2519
Almonds, Young	176	176	199
Apples	400	264	117
Apricots	369	824	190
Apricots, Young		155	
Artichokes			
Asparagus			105
Barley	299	438	
Beans (green)	479	156	
Broccoli (Fall)			92
Broccoli (Spring)			
Bushberries	80		101
Cabbage (Fall)			
Cabbage (Spring)			
Carrots (Fall)	10493	12484	12870
Carrots (Spring)	4673	4157	5469
Cauliflower (Fall)			
Cauliflower (Spring)			
Cherries	1363	1152	1811
Cherries, Young	362	443	606
Clover		60	
Corn	785	753	999
Cotton	4828	4972	3098
Fallow		292	
Flowers & Nursery	150	150	445
Grapefruit	213	173	174
Grapefruit, Young			
Jojoba	20		153
Lemons	79	79	123
Lemons, Young			42
Lettuce (Fall)	661	766	356
Lettuce (Spring)	308	398	272
Melons, cucumbers, squash (all types)	2300	2425	2218
Misc. Deciduous	39	39	47
Misc. Field			224
Misc. Hay & Grain	5678	3748	939
Misc. Subtropical Fruits			1533

**Table 6. Irrigated Acreage of Various Crops Grown in the AEWSD
for Water Delivery Years 2003-04 through 2005-06 (Continued)**

Crop	2003-04	2004-05	2005-06
	Acres		
Misc. Subtropical Fruits, Young			
Misc. Truck/Berry	445	237	1252
Mixed Pasture	81	81	511
Native Pasture			
Oats		370	2074
Onions & Garlic	4244	4675	3127
Oranges	12866	13137	12330
Oranges, Young	1242	1114	179
Peaches & Nectarines	3010	2910	2758
Peaches & Nectarines, Young	114	46	207
Pears			30
Peppers (all types)	1742	1998	1922
Pistachios	129	121	168
Plums	492	407	228
Plums, Young	20		24
Potatoes	14800	14317	16150
Safflower	40	40	138
Sunflowers			
Sweet Potatoes			
Tomatoes	3230	3379	2214
Tree Farm			
Turf Farm	60	60	278
Vineyards	27290	27424	28365
Vineyards, Young	1771	1262	950
Walnuts	547	547	585
Walnuts, Young			158
Wheat	5446	6383	6773
Total	115662	116168	116269

Table 7. Total ETc Demand of Various Crops Grown in the AEWS
for Water Delivery Years 2003-04 through 2005-06

Crop	2003-04	2004-05	2005-06
	Acre-feet		
Alfalfa	7,365	6,600	4,386
Almonds	7,841	7,171	8,281
Almonds, Young	578	635	654
Apples	1,556	1,117	462
Apricots	1,212	2,971	625
Apricots, Young	0	551	
Artichokes			
Asparagus		0	420
Barley	46	887	671
Beans (green)	654	240	
Broccoli (Fall)			44
Broccoli (Spring)			
Bushberries	292		376
Cabbage (Fall)			
Cabbage (Spring)			
Carrots (Fall)	13,563	15,802	16,402
Carrots (Spring)	7,082	7,406	8,013
Cauliflower (Fall)			
Cauliflower (Spring)			
Cherries	5,303	4,873	7,153
Cherries, Young	1,408	1,874	2,394
Clover	0	295	
Corn	1,900	2,003	2,558
Cotton	12,172	13,773	8,253
Fallow	0	1,437	
Flowers & Nursery	295	318	861
Grapefruit	575	505	463
Grapefruit, Young			
Jojoba	51	0	402
Lemons	252	272	377
Lemons, Young		0	127
Lettuce (Fall)	670	767	342
Lettuce (Spring)	81	300	194
Melons, cucumbers, squash (all types)	4,029	4,652	4,007
Misc. Deciduous	125	137	152
Misc. Field			684
Misc. Hay & Grain	875	7,588	1,621
Misc. Subtropical Fruits		0	3,925

**Table 7. Total ETc Demand of Various Crops grown in the AEWSd
for Water Delivery Years 2003-04 through 2005-06 (Continued)**

Crop	2003-04	2004-05	2005-06
	Acre-feet		
Misc. Subtropical Fruits, Young			
Misc. Truck/Berry	1,622	950	4,667
Mixed Pasture	380	412	2,339
Native Pasture			
Oats		52	3,580
Onions & Garlic	1,657	11,324	6,781
Oranges	41,062	45,287	38,747
Oranges, Young	3,964	3,840	563
Peaches & Nectarines	9,639	10,223	8,897
Peaches & Nectarines, Young	365	162	668
Pears			97
Peppers (all types)	3,428	4,411	3,797
Pistachios	442	451	584
Plums	1,575	1,430	736
Plums, Young	64		77
Potatoes	23,382	26,703	24,401
Safflower	90	103	306
Sunflowers			
Sweet Potatoes			
Tomatoes	6,624	7,672	4,617
Tree Farm			
Turf Farm	235	255	1,040
Vineyards	56,002	63,195	60,061
Vineyards, Young	3,634	2,908	2,012
Walnuts	1,852	1,992	2,015
Walnuts, Young			544
Wheat	839	12,923	11,691
Total	224,781	276,467	252,066

V. CROP LEACHING

Drainage of irrigated cropland is essential to remove excess soluble salts from the soil and to maintain optimum crop productivity. Increases in soil salinity levels primarily occur as a result of salt importation from irrigation water and, to a lesser extent, from other sources such as fertilizers and soil amendments (Hanson et al., 1993). Water imported into the District from the CVP (Friant-Kern Canal) and State Water Projects (Cross Valley Canal and AEWS Intertie Pipeline⁵) contains very little soluble salt. Similarly, the quality of groundwater pumped within the District is also very good. Over time, however, salt accumulation will occur in the crop root zone if an appropriate leaching fraction is not provided. Since effective rainfall is often lacking or inconsistent in the region, leaching of salts out of the crop root zone must be accomplished through the application of additional irrigation water.

The leaching fraction (LF) is defined in this analysis as the incremental portion of infiltrated water, beyond that required for crop evapotranspiration (ET_c) that must pass through the root zone to maintain the soil solution at a salinity level compatible with the particular crop being grown. The LF is dependent upon the salinity of the irrigation water and the salinity tolerance of the crop. It may be calculated as follows:

$$LF = \frac{EC_w}{5 (EC_e) - EC_w}$$

where,

EC_w = the electrical conductivity of the irrigation water (Section 3, page 7).

EC_e = the maximum electrical conductivity of the saturated soil paste extract at which 100 percent crop yield is maintained. This is also described as the crop salinity threshold.

Accordingly, the leaching requirement (LR) is defined as the incremental portion of water necessary to satisfy the required leaching fraction. It is dependent upon the crop ET demand (ET_c) and is expressed as a depth of water in inches, feet, acre-inches, or acre-feet per acre. The LR may be calculated as follow:

$$LR = \frac{ET_c * LF}{1 - LF}$$

where,

ET_c = the net crop evapotranspiration requirement.

LF = the leaching fraction.

⁵ Intertie Pipeline deliveries began in July 2002

It is important to note that the terms LF and LR are sometimes used interchangeably. Both terms refer to that portion of irrigation water, which should pass through the root zone to maintain salts at a desired level. As indicated in the equations above, however, LR should be considered as a specified volume of water, which is dependent upon the crop ET requirement (ETc), whereas LF is expressed only as a fraction or percentage.

Water sources within the AEWSO include both imported surface and groundwater supplies. Imported surface water is acquired primarily from the Friant-Kern Canal, through a series of exchange agreements through the Cross Valley Canal, and the District's Intertie Pipeline. To a lesser extent, imported surface water may also be obtained from the Kern River and other sources. The annual surface water allocation is supplemented by groundwater, which is pumped in various amounts from three separate well fields, based on irrigation demands within the District. Water from all sources (surface and groundwater) is combined in the District conveyance system prior to delivery to water users. Thus, the quality of water delivered to District users could represent a composite of various water sources (blended).

Water quality measurements are compiled monthly at three locations along the District canal. These measurements provide a good indication of the salinity of the water, which is delivered for irrigation use throughout the crop season. To estimate an appropriate LR for each crop, an estimate of the average water salinity was determined for each year as shown in Table 2 (Section 3, page 8).

Based upon salinity thresholds for specific crops, as documented in the literature and presented in Table 8, an appropriate LF for each crop grown in the District was determined. The LF values (not shown) together with the total ETc demands (Table 7) were then used to determine the LR for each crop. The results are provided for years 2003-04 through 2005-06 in Table 9. Appendix 1 (Table 6 and 6A) provides the same information for previous years. Lastly, the total ETc and LR demand for crops grown in the District are presented in Table 10 for the years 2003-04 through 2005-06 and Appendix 1 (Table 7 and 7A) for previous years.

Table 8. Crop Salinity Thresholds for Various Crops Grown in the AEWSD

Crop	Salinity Threshold (dS/m)	Crop	Salinity Threshold (dS/m)	Crop	Salinity Threshold (dS/m)
Alfalfa43	2.0	Field Corn (Latest)	6.8	Pears	1.5
Alfalfa91	2.0	Field Corn (Late)	1.7	Pecans	1.5
Alfalfa126	2.0	Figs	2.7	Peppers	1.5
Alfalfa156	2.0	Flowers & Nursery	2.5	Peppers (all types)	1.5
Alfalfa184	2.0	Garlic	1.2	Peppers (Late)	1.5
Alfalfa213	2.0	Garlic (Early)	1.2	Persimmons	1.5
Alfalfa244	2.0	Grain Hay	6.0	Pistachios	2.5
Almonds	1.5	Grapefruit	1.7	Pistachios Standard	2.5
Almonds, Young	1.5	Grapes (Ar-Ed)	1.5	Plums	1.5
Apples	1.5	Grapes	1.5	Plums, Young	1.5
Apricots	1.6	Irrigated Pasture	4.0	Potatoes	1.7
Apricots, Young	1.6	Jojoba	1.7	Pumpkins	2.2
Artichokes	1.0	Kiwi	1.5	Radishes	1.2
Barley	8.0	Lettuce (Fall)	1.3	Rice	3.0
Beans (Blackeye)	1.3	Lettuce (Spring)	1.3	Safflower	5.3
Beans (Dry)	1.0	Melons	2.2	Safflower (Early)	5.3
Beans (Green)	1.0	Melons(Early)	2.2	Safflower (Late)	5.3
Berries	1.5	Melons, cucumbers, squash	2.2	Silage (Early)	6.8
Broccoli (Fall)	2.8	Milo (Sorghum)	6.8	Silage (Late)	6.8
Broccoli (Spring)	1.8	Misc. Deciduous	1.7	Small Grains	6.0
Cabbage (Fall)	1.8	Misc. Field	6.0	Sod	4.0
Cabbage (Spring)	1.8	Misc. Hay & Grain	6.0	Spinach	1.2
Cactus	4.0	Misc. Subtropical Fruits	1.7	Squash	2.5
Cantaloupes	2.2	Misc. Subtropical Fruits, Young	1.7	Strawberries	1.0
Carrots (Fall)	1.0	Misc. Trees	1.7	Sudangrass	2.8
Carrots (Spring)	1.0	Misc. Truck/Berry	1.5	Sugarbeets	7.0
Cauliflower (Fall)	1.8	Misc. Veg.	1.2	Sunflowers	5.3
Cauliflower (Spring)	1.8	Native Pasture	6.0	Sweet Corn (Early)	1.7
Cherries	1.5	Nectarines	1.7	Sweet Corn (Late)	1.7
Cherries, Young	1.5	Nursery Roses	0.0	Sweet Potatoes	1.5
Christmas	1.5	Oats	6.0	Tomatoes	2.5
Citrus (All)	1.7	Onions & Garlic	1.2	Tomatoes (Late)	2.5
Cole Crops (Fall)	2.3	Onions (Early)	1.2	Turf Farm	4.0
Cole Crops (Spring)	2.3	Onions (Late)	1.2	Turnip	1.0
Corn	1.7	Oranges	1.7	Urban Water	4.0
Cotton	7.7	Oranges, Young	1.7	Vineyards	1.5
Eucalyptus	8	Parsnips	1.0	Vineyards, Young	1.5
Eggplant	1.1	Peaches	1.7	Walnuts	1.7
Fallow	4.0	Peaches & Nectarines	1.7	Watermelon	2.2
		Peaches & Nectarines, Young	1.7	Wheat	6.0

**Table 9. Leaching Requirement (LR) for Various Crops Grown in the
AEWSD for Water Delivery Years 2003-04 through 2005-06**

AVERAGE for Water Delivery Years 2003-04 through 2005-06			
Crop	2003-04	2004-05	2005-06
	Acre-feet		
Alfalfa	135	174	36
Almonds	193	257	90
Almonds, Young	14	23	7
Apples	38	40	5
Apricots	28	99	6
Apricots, Young	0	18	
Artichokes			
Asparagus		0	2
Barley	0	6	1
Beans (green)	25	13	
Broccoli (Fall)			0
Broccoli (Spring)			
Bushberries	7		4
Cabbage (Fall)			
Cabbage (Spring)			
Carrots (Fall)	515	881	271
Carrots (Spring)	269	413	133
Cauliflower (Fall)			
Cauliflower (Spring)			
Cherries	131	175	78
Cherries, Young	35	67	26
Clover	0	4	
Corn	41	63	25
Cotton	56	91	17
Fallow	0	18	
Flowers & Nursery	4	7	6
Grapefruit	12	16	4
Grapefruit, Young			
Jojoba	1	0	4
Lemons	5	9	4
Lemons, Young		0	1
Lettuce (Fall)	19	32	4
Lettuce (Spring)	2	13	2
Melons, cucumbers, squash (all types)	67	111	30
Misc. Deciduous	3	4	1
Misc. Field			2
Misc. Hay & Grain	5	65	4

Table 9. Leaching Requirement (LR) for Various Crops Grown in the AEWSD for Water Delivery Years 2003-04 through 2005-06 (Continued)

Crop	2003-04	2004-05	2005-06
	Acre-feet		
Misc. Subtropical Fruits		0	38
Misc. Subtropical Fruits, Young			
Misc. Truck/Berry	40	34	51
Mixed Pasture	3	5	9
Native Pasture			
Oats		0	10
Onions & Garlic	52	517	93
Oranges	889	1420	372
Oranges, Young	86	120	5
Peaches & Nectarines	209	321	85
Peaches & Nectarines, Young	8	5	6
Pears			1
Peppers (all types)	85	158	41
Pistachios	6	9	4
Plums	39	51	8
Plums, Young	2		1
Potatoes	506	837	234
Safflower	1	1	1
Sunflowers			
Sweet Potatoes			
Tomatoes	96	160	30
Tree Farm			
Turf Farm	2	3	4
Vineyards	1382	2265	655
Vineyards, Young	90	104	22
Walnuts	40	62	19
Walnuts, Young			5
Wheat	5	110	31
Total	5,146	8,783	2,491

Table 10. Total of ETC and LR Demand for Crops Grown in the AEWSD for Water Delivery Years 2003-04 through 2005-06

Crop	2003-04	2004-05	2005-06
	Acre-feet		
Alfalfa	7,500	6,774	4,421
Almonds	8,034	7,428	8,371
Almonds, Young	592	657	661
Apples	1,595	1,157	467
Apricots	1,240	3,070	631
Apricots, Young	0	569	
Artichokes			
Asparagus		0	422
Barley	46	892	672
Beans (green)	679	254	
Broccoli (Fall)			44
Broccoli (Spring)			
Bushberries	299		381
Cabbage (Fall)			
Cabbage (Spring)			
Carrots (Fall)	14,077	16,683	16,673
Carrots (Spring)	7,351	7,819	8,146
Cauliflower (Fall)			
Cauliflower (Spring)			
Cherries	5,434	5,048	7,231
Cherries, Young	1,443	1,941	2,420
Clover	0	299	
Corn	1,941	2,066	2,582
Cotton	12,228	13,864	8,270
Fallow	0	1,456	
Flowers & Nursery	299	325	866
Grapefruit	588	520	467
Grapefruit, Young			
Jojoba	52	0	406
Lemons	258	281	381
Lemons, Young		0	128
Lettuce (Fall)	689	799	346
Lettuce (Spring)	84	313	197
Melons, cucumbers, squash (all types)	4,096	4,763	4,036

Table 10. Total of ETc and LR Demand for Crops Grown in the AEWSD for Water Delivery Years 2003-04 through 2005-06 (Continued)

Crop	2003-04	2004-05	2005-06
	Acre-feet		
Misc. Deciduous	128	141	153
Misc. Field			685
Misc. Hay & Grain	880	7,653	1,625
Misc. Subtropical Fruits		0	3,963
Misc. Subtropical Fruits, Young			
Misc. Truck/Berry	1,662	984	4,718
Mixed Pasture	383	417	2,349
Native Pasture			
Oats		53	3,590
Onions & Garlic	1,709	11,841	6,874
Oranges	41,951	46,707	39,119
Oranges, Young	4,050	3,961	568
Peaches & Nectarines	9,847	10,544	8,983
Peaches & Nectarines, Young	373	167	674
Pears			98
Peppers (all types)	3,513	4,569	3,839
Pistachios	448	460	587
Plums	1,614	1,481	744
Plums, Young	66		78
Potatoes	23,888	27,540	24,635
Safflower	91	104	307
Sunflowers			
Sweet Potatoes			
Tomatoes	6,721	7,832	4,647
Tree Farm			
Turf Farm	237	259	1,044
Vineyards	57,383	65,460	60,716
Vineyards, Young	3,724	3,012	2,034
Walnuts	1,892	2,054	2,034
Walnuts, Young			549
Wheat	844	13,033	11,723
Total	229,927	285,250	254,556

VI. SUMMARY ANALYSIS

Table 11 presents a summary of the available water supplies within the AEWS for the years 1994-95 through 2005-06. As the tables indicate, the District receives water from both surface and groundwater sources. This concept was implemented in order to accommodate a relatively consistent irrigation demand schedule with a variable water supply. Water conveyed to the District from surface sources is delivered directly for irrigation through the distribution system. Water in excess of irrigation demands is applied to spreading basins for percolation into groundwater storage. Thus, during periods of insufficient surface water supply, water previously percolated into underground storage may be recovered and used to offset deficiencies. Table 12 presents a summary of water demands within AEWS for the years 1994-95 through 2005-06 and includes groundwater storage used to supplement District wide water demands. As this table indicates, the amount of water diverted to groundwater storage in any given year may be highly variable.

The District delivers the available water supply (i.e., a combination of surface and groundwater sources) to about 40 percent of the cropped land within its boundaries. Growers receiving District water have ceased groundwater pumping which, in turn, reduces groundwater overdraft and provides for remaining lands to be irrigated with a stabilized groundwater source. Table 12 indicates the total amount of water available to the District, the portion allocated to groundwater recharge, and the net amount of water delivered to users. The difference between supply and demand not accounted for in the spreading amount is attributable to District losses due to factors such as evaporation, seepage, or metering inaccuracies.

Table 13 presents a summary of reasonable irrigation water requirements for the AEWS from 1994-95 through 2005-06. The sum of ETc, LR, and the operational component represents an estimate of beneficial use of irrigation water within the District. This amount has been adjusted downward for effective rainfall. An estimate of the total District irrigation water requirement is indicated in Column 5.

The leaching percentage is displayed in Figure 3. Based on the analysis presented here, the addition of the linear trend line provides an indication that the percentage of leaching has been declining since 1999. This downward trend is caused by the decreasing concentration of salts within the Districts source water.

Figure 4 provides a representation of the Total District Water Requirements broken down by Net Irrigation Requirement and Operational Component for the years 1994-95 through 2005-06. Figure 5 provides a representation of the Total Irrigation Requirement vs. the Total Water Supply within AEWS for the years 1994-95 through 2005-06. Figure 6 provides the Total Water Distribution broken down by Calculated Operational Losses, Net Groundwater Recharge, and SWSA Deliveries for the years 1994-95 through 2005-06.

Table 11. Summary of Water Supplies within the AEWS for Water Delivery Years 1994-95 through 2005-06

Water Source	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
	Acre-feet											
Surface Supplies												
Friant-Kern Canal	37,639	246,253	172,007	178,237	120,006	69,511	106,845	32,786	42,561	91,801	60,845	222,589
Cross-Valley Canal	50,963	23,696	12,481	11,206	11,643	144,243	148,389	13,602	50,821	64,018	40,714	15,565
Kern River	1,200	9,802	47,323	68,772	81,548	37,588	1,973	662	2,847	0	341	10,148
Farm Wells	0	0	0	0	0	0	0	156	0	0	0	0
Intertie Pipeline												
Total Surface Supplies	89,802	279,751	231,811	258,215	213,197	251,342	257,207	47,206	99,001	171,215	108,504	253,445
Groundwater Supplies (District owned wells only)												
Sycamore Well Field	39,752	391	0	0	0	114	1,693	56,355	36,189	7,772	48,291	0
Tejon Well Field	26,867	661	0	0	0	900	3,350	42,866	36,514	6,684	38,720	174
North Canal Wells	8,660	43	0	0	0	35	384	18,387	7,816	1,194	13,114	0
Total Ground-water Supplies	75,279	1,095	0	0	0	1,049	5,427	117,608	80,519	16,650	100,125	174
Total Water Supply to District	165,081	280,846	231,811	258,215	213,197	252,391	262,634	164,814	179,520	187,865	208,629	253,619

Table 12. Summary of Water Demands within the AEWS for Water Delivery Years 1994-95 through 2005-06

Water Source	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
	Acre-feet											
Net Amount of Groundwater Recharge	12,839	109,226	57,539	63,364	77,457	80,542	97,399	2,558	9,090	43,180	31,669	105,723
Deliveries To:												
SWSA ⁶ Intertie	137,277	135,481	147,303	149,338	114,123	151,376	143,549	153,828	148,054 11,483	132,943 897	143,662 25,512	139,033
Calculated Losses ⁷	14,965	36,139	26,969	45,513	21,617	20,473	21,686	8,428	22,376	10,845	7,786	8,863
Total Demand (SWSA)	165,081	280,846	231,811	258,215	213,197	252,391	262,634	164,814	179,520	187,865	208,629	253,619

⁶ SWSA = Surface Water Service Area

⁷ Calculated losses equal Total District Supply minus all Deliveries and Groundwater recharged.

Table 13. Summary of Reasonable Water Requirements for the AEWSD for Water Delivery Years 1994-95 through 2005-06

Year	ETc+LR 1	Effective Rainfall 2	Net Irrigation Requirement 3	Operational Component 4	Total District Water Requirement 5
Acre-feet					
1994-95	270,125	40,449	229,676	57,419	287,095
1995-96	263,116	54,338	208,778	52,195	260,973
1996-97	320,810	25,267	295,543	73,886	369,429
1997-98	308,726	28,147	280,579	70,145	350,724
1998-99	275,295	74,212	201,083	50,271	251,354
1999-00	255,249	1,066	254,183	63,546	317,729
2000-01	272,194	16,262	255,932	63,983	319,915
2001-02	286,856	4,499	282,357	70,589	352,946
2002-03	287,169	15,273	271,896	67,974	339,870
2003-04	229,927	30,476	199,451	49,863	249,314
2004-05	285,250	5,518	279,732	69,933	349,665
2005-06	254,556	21,460	233,096	58,274	291,370
12 Year Average	275,773	26,414	251,375	62,340	311,699

- 1 From Table 8.
- 2 Calculated using USBR formula for utilizable precipitation (see Table 1). Annual precipitation amounts were the combined average values compiled from the Sycamore, Tejon, and District office weather stations located within the AE WSD boundaries.
- 3 Columns (1) – (2).
- 4 Reasonable and unavoidable loss due to irrigation system non-uniformity, soil variation, wind, evaporation, management constraints, economics, etc. Assumes 80% District water management efficiency.
- 5 Columns (3) + (4). Values in Column (5) do not include water for various other practices that are considered beneficial, or water required for Municipal and Industrial uses.

Note: See Figure 4 (page 30) for graphical representation of columns (4) and (5).

Figure 3. Leaching Percent for Years 1999-00 through 2005-06

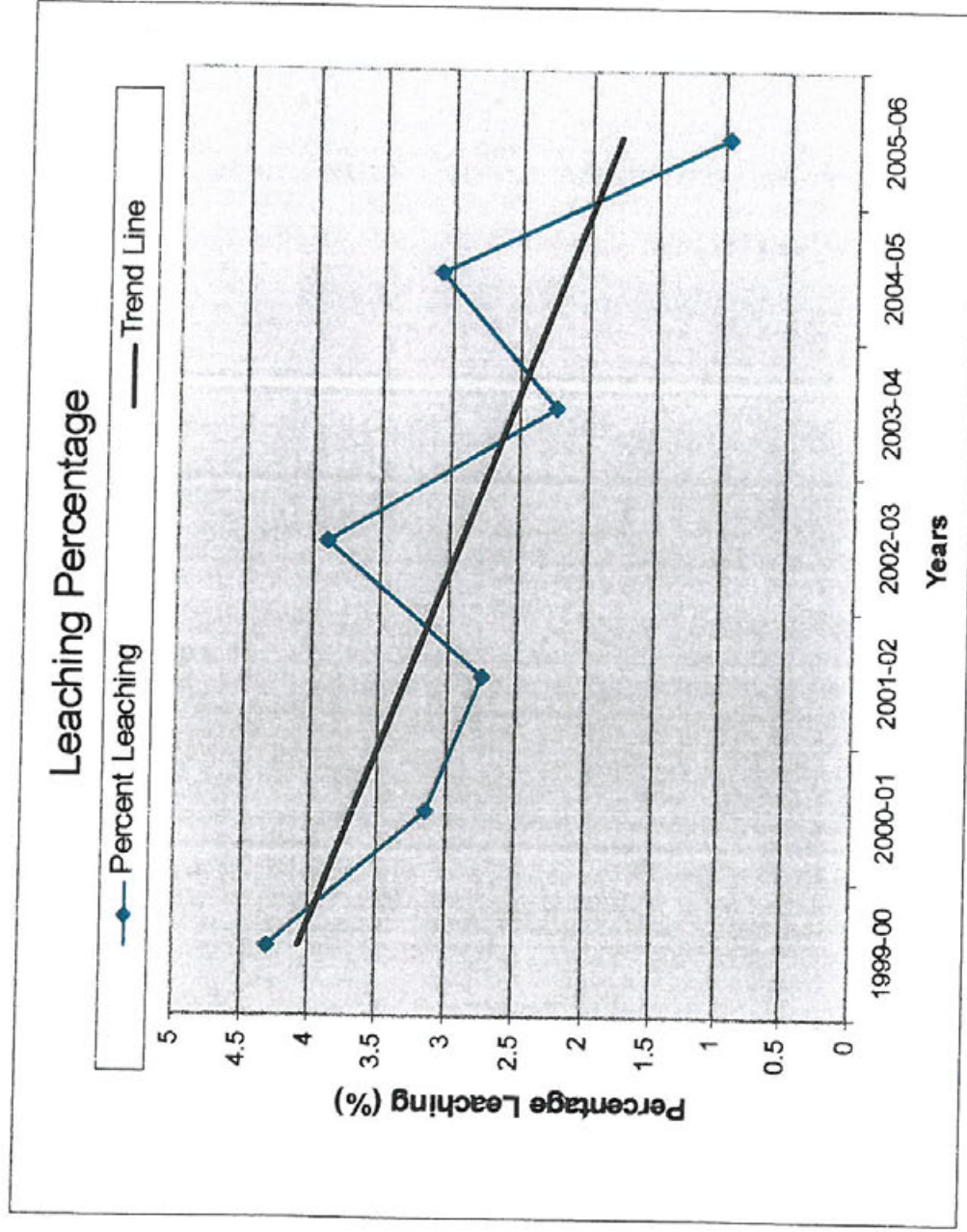
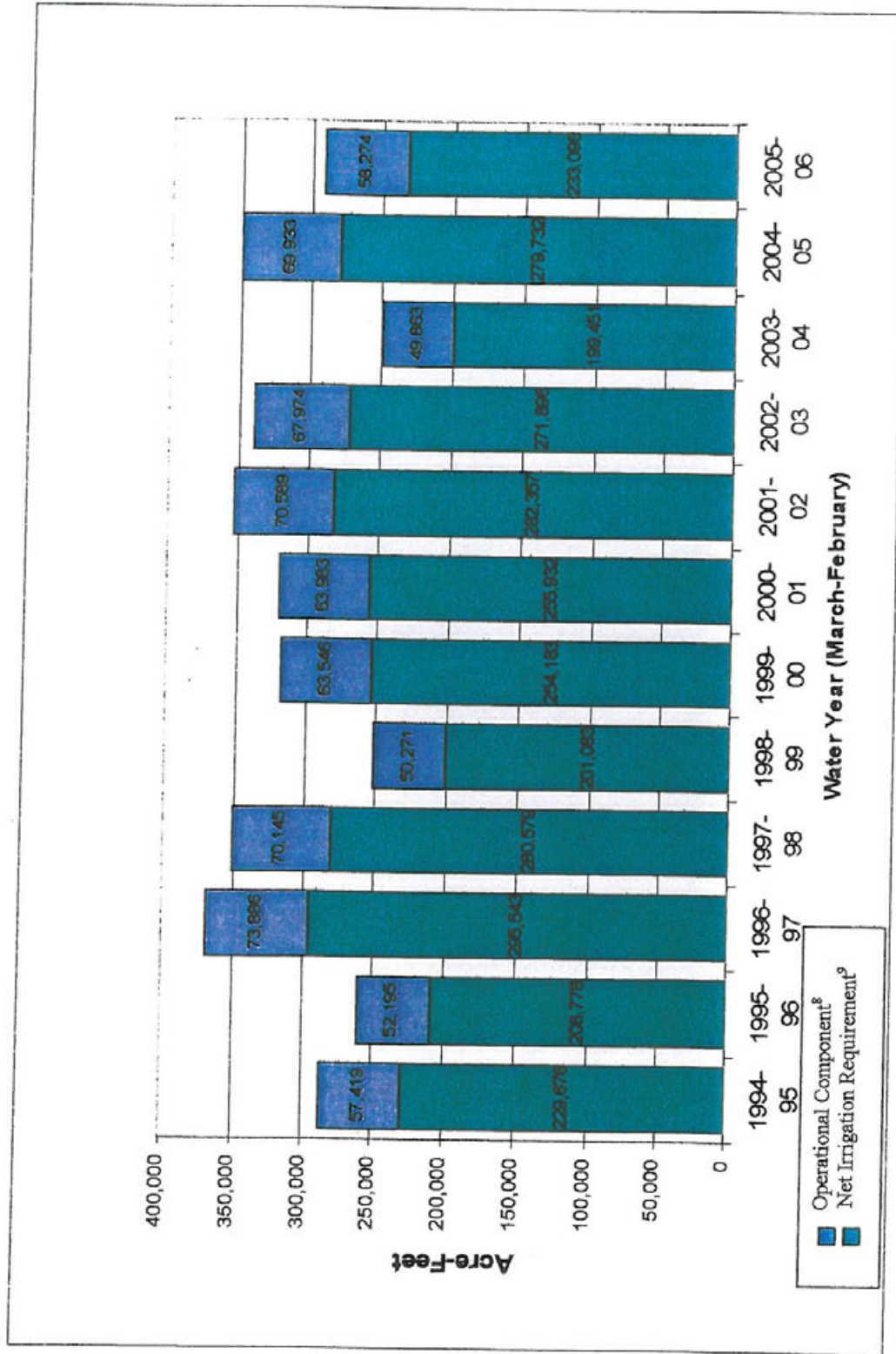


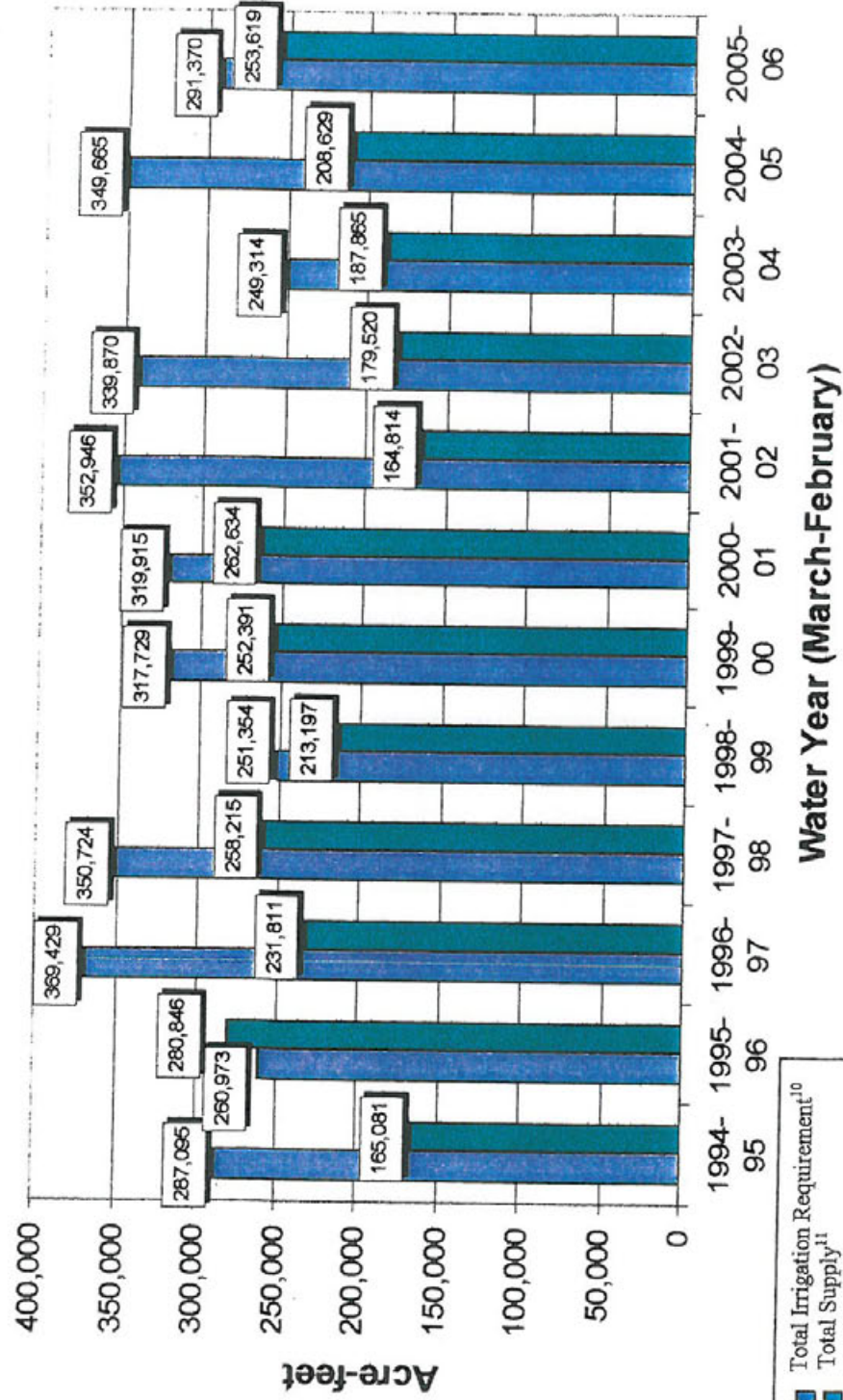
Figure 4. Total District Water Requirement



⁸ Operational Component is from Table 13, Column 4

⁹ Net Irrigation Requirement is from Table 13, Column 3

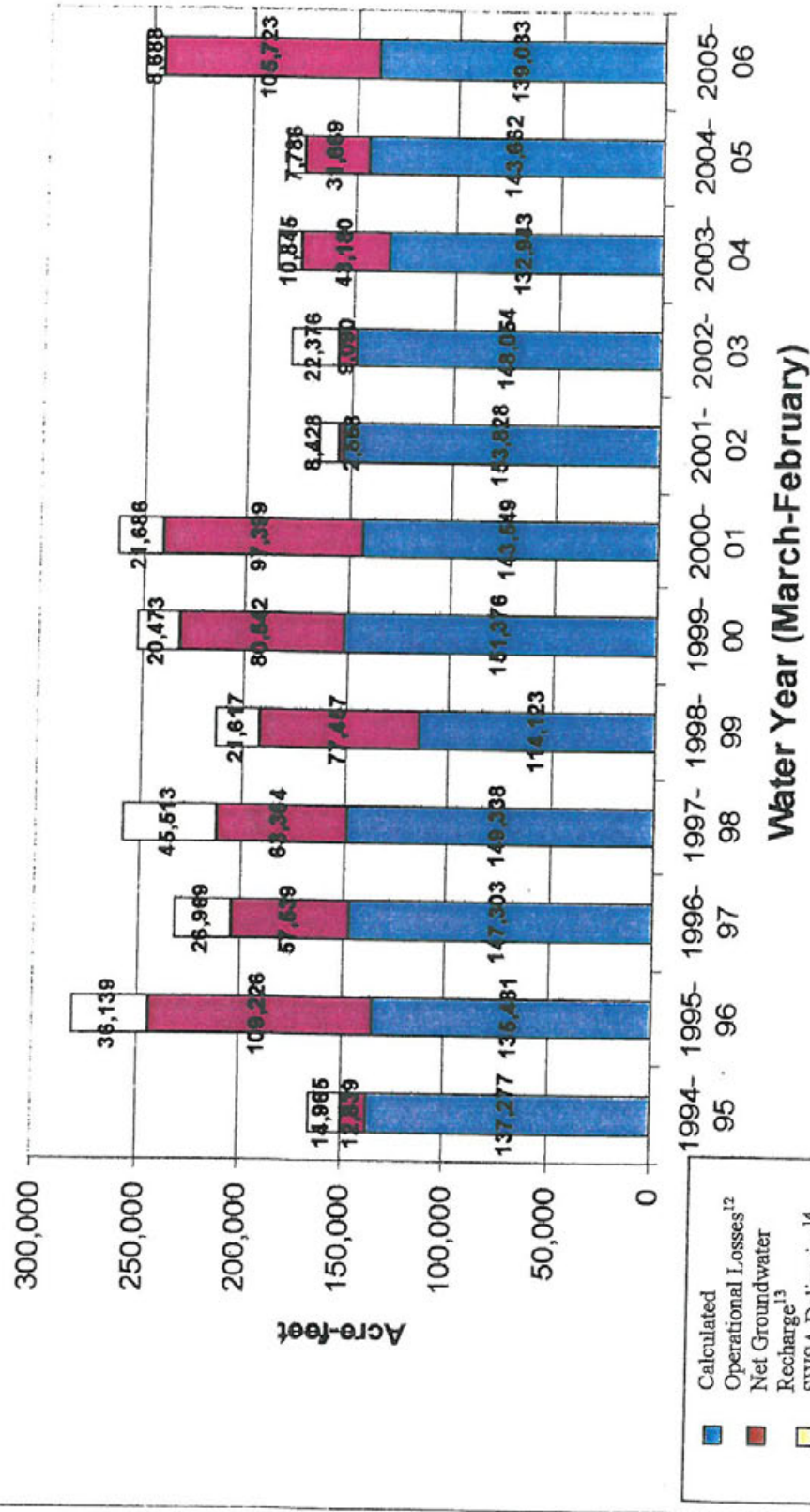
Figure 5. Total Irrigation Requirement vs. Total Water Supply



¹⁰ Total Irrigation Requirement is from Table 13, Column 5

¹¹ Total Supply is from Table 11, Last Row

Figure 6. Total Water Distribution



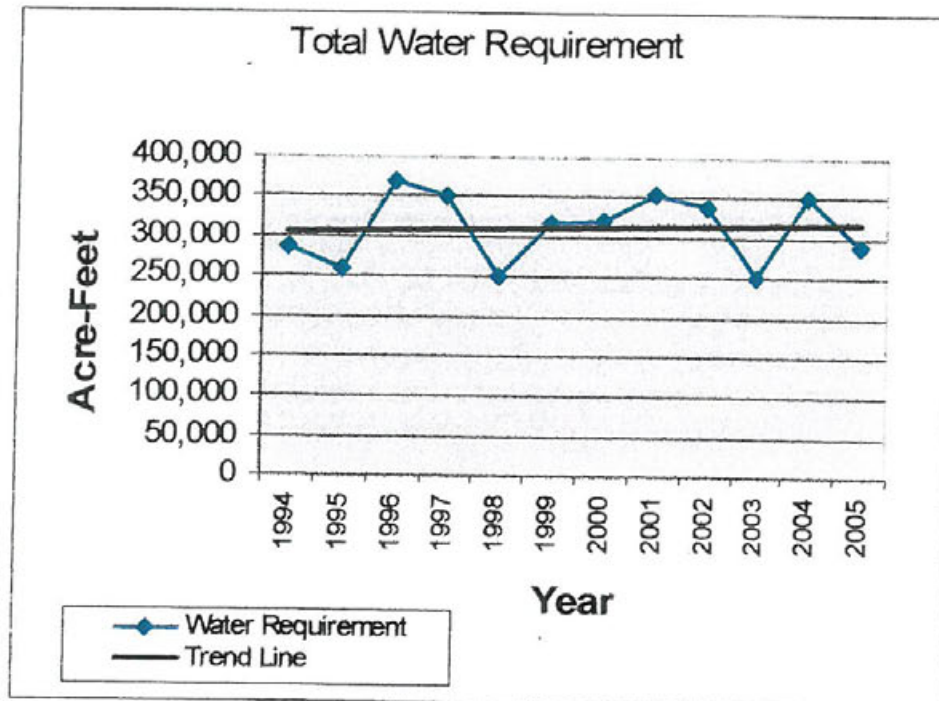
¹² Calculated Operational Losses is from Table 12, Row 4

¹³ Net Groundwater Recharge is from Table 12, Row 1

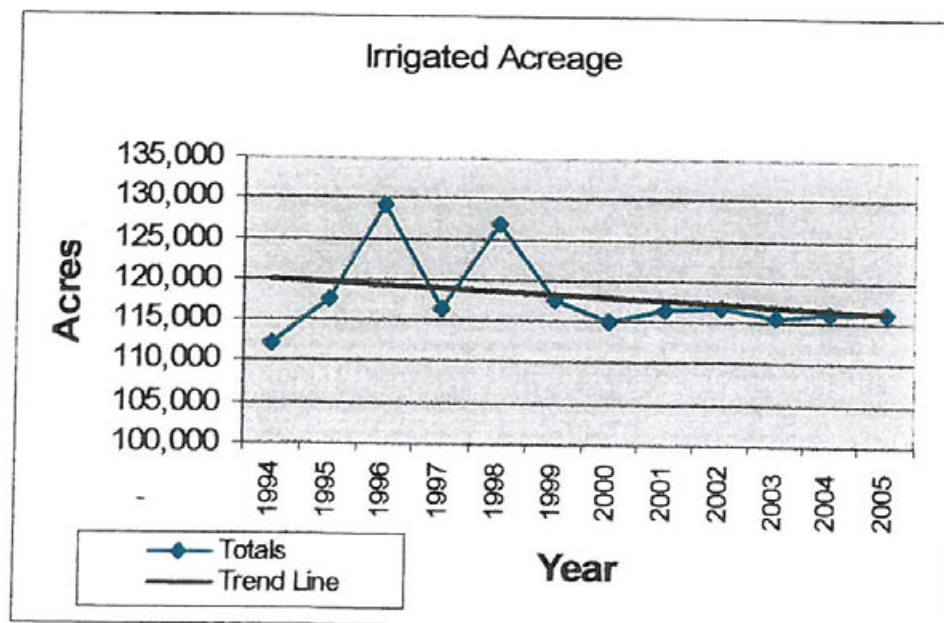
¹⁴ SWSA Deliveries is from Table 12, Row 2

Figure 7 provides a graphical representation of various contributors to the AEWSD's water requirements. Each segment provides a trend line representative of the contributor. The trend line shown in segment (a) Figure 7 increases slightly; indicating that the water needs over the last 10 years has increased only slightly.

The major factors which adds to an increase in the water requirements, is the increase in annual reference evapotranspiration (segment (c), Figure 7) This was offset by the decrease in irrigated acreage (segment (b), Figure 7) and the decrease in salinity as shown in the water quality (segment (d), Figure 7). The annual rainfall trend decreased which would also have the effect of increasing the water requirement (segment (e), Figure 7) for the time period.

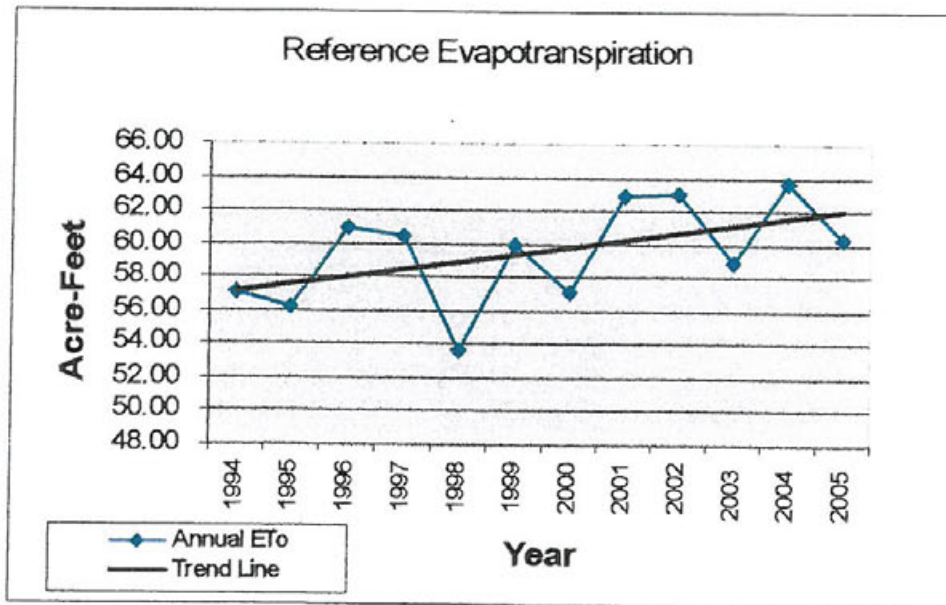


a. Total Water Requirement

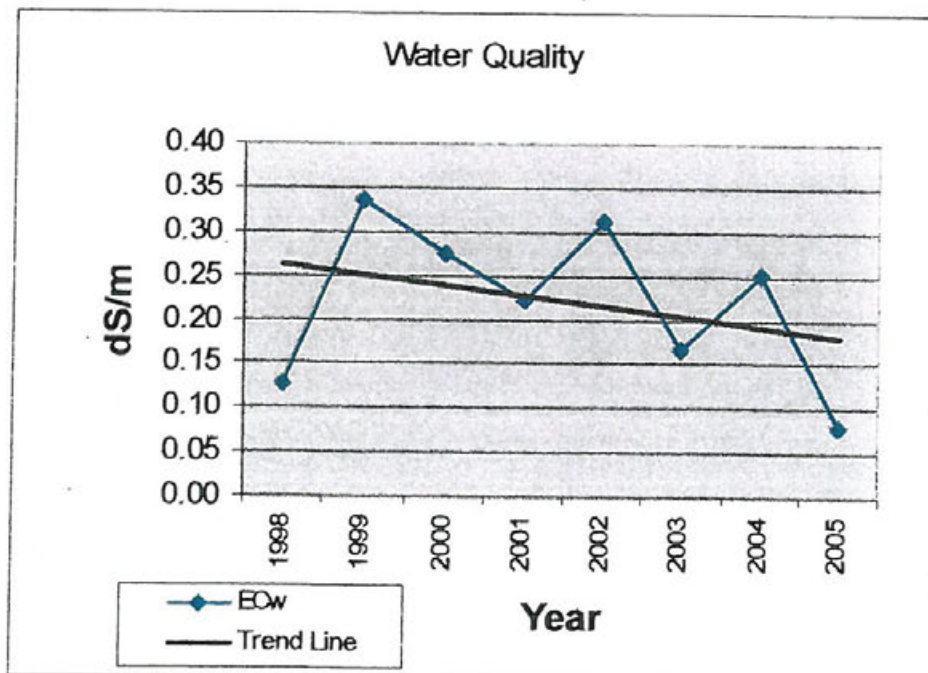


b. Irrigated Acreage

FIGURE 7. Trend Lines

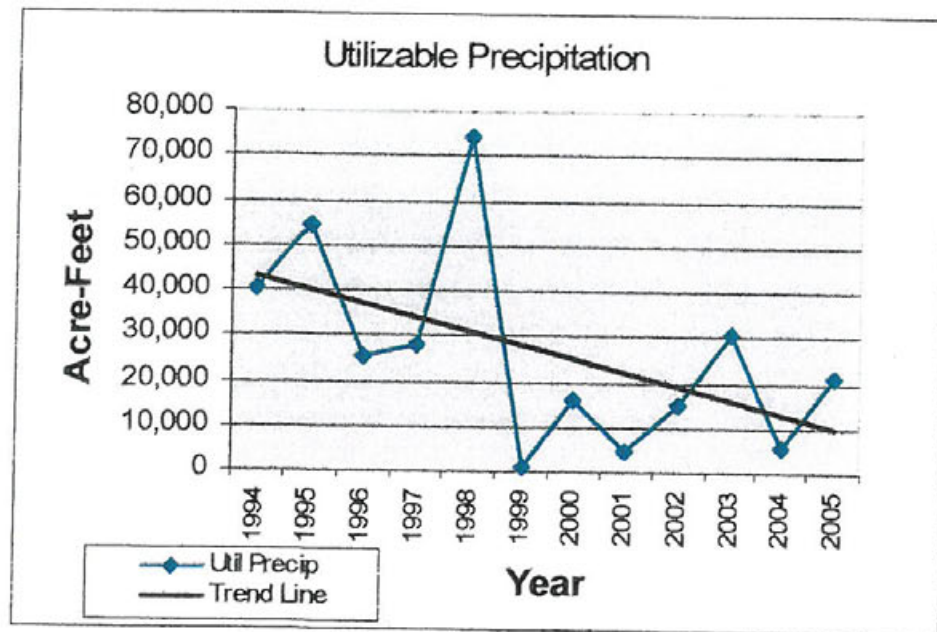


c. Reference Evapotranspiration with Trend



d. Water Quality with Trend

FIGURE 7. Trend Lines (Cont.)



e. Water Quality with Trend

FIGURE 7. Trend Lines (Cont.)

VII. Appendix 1 – Historical Data

Table 1.¹⁵ Water Quality Measurements – Historical Data

Water Source	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg
ECw in micromhos/cm													
1995 Intake	260	80	70	60	40	30	20	40	15	14	30	30	57.42
North	300	130	60	60	40	30	20	40	14	13	30	40	64.75
South	290	130	70	60	40	30	20	40	16	12	30	40	64.83
micromhos/cm =													62.33
dS/m =													0.06
1996 Intake	30	40	40	50	30	30	170	20	30	30	60	15	45.42
North	30	40	40	50	30	30	150	30	60	30	70	20	48.33
South	30	40	40	50	30	30	150	20	60	30	60	11	45.92
micromhos/cm =													46.56
dS/m =													0.05
1997 Intake	50	110	50	40	40	60	70	70	50	70	30	30	55.83
North	50	110	50	40	40	60	70	70	50	70	30	30	55.83
South	50	110	50	40	40	60	70	70	50	70	30	30	55.83
micromhos/cm =													55.83
dS/m =													0.06
1998 Intake	410	60	160	160	100	80	30	50	170	130	120	310	148.33
North	410	40	160	160	120	70	30	20	160	140	120	170	133.33
South	520	50	160	170	100	70	30	30	150	150	120	200	145.83
micromhos/cm =													142.5
dS/m =													0.1425
weighted dS/m ¹⁶ =													0.127
1999 Intake	50	30	140	250	310	310	240	230	270	460	450	220	246.67
North	50	40	170	230	290	320	270	240	260	460	460	50	236.67
South	50	30	150	260	270	330	280	240	260	470	450	50	236.67
micromhos/cm =													240.00
dS/m =													0.24
weighted dS/m ¹⁶ =													0.34
2000 Intake	780	470	70	260	40	390	260	220	200	290	480	600	338.33
North	770	490	370	190	110	370	270	220	210	240	480	590	359.17
South	770	480	390	170	190	420	270	230	200	200	470	540	360.83
micromhos/cm =													352.78
dS/m =													0.35
weighted dS/m ¹⁶ =													0.28

¹⁵ Water Year = March through February

¹⁶ Weight Sum based on water year. Weighted sum procedure not implemented until 1998 and was not used for 1995-1997.

Table 1. Water Quality Measurements – Historical Data (Continued)

Water Source		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg
		ECw in micromhos/cm												
2001	Intake	70	300	210	240	110	120	180	160	340	0	0	360	209.00
	North	70	200	230	240	230	300	270	280	260	250	260	320	242.50
	South	60	300	270	290	260	290	300	280	270	310	330	280	270.00
		micromhos/cm = 240.50												
		dS/m = 0.24												
		weighted dS/m = 0.22												
2002	Intake	50	50	290	420	125	513	390	397	472	330	50	259	278.83
	North	70	250	250	420	295	367	340	276	563	290	45	128	274.50
	South	80	280	330	440	309	414	350	349	560	361	46	194	309.38
		micromhos/cm = 287.57												
		dS/m = 0.29												
		weighted dS/m = 0.31												

Table 2. Summary of Reference Evapotranspiration (ETo)¹⁷ in the AEWS for Water Years 1994-95 through 2002-03.

Month	1994-95 ¹⁸	1995-96 ¹⁹	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03
	Inches								
March	4.28	3.48	3.94	4.71	3.33	3.58	3.55	3.94	4.53
April	5.76	5.12	5.93	6.2	4.87	5.54	4.5	5.21	5.54
May	6.87	6.21	8.03	8.38	5.47	7.73	7.36	8.54	7.97
June	8.75	8.02	8.83	8.32	7.38	8.37	8.76	9.41	9.17
July	9.03	8.57	9.32	8.81	8.95	8.83	8.83	9.08	9.48
August	7.9	8.34	8.88	8.28	8.36	8.45	8.36	8.74	8.78
September	5.22	5.9	6.34	5.95	5.46	6.36	5.76	6.38	6.41
October	4.39	4.36	4.23	4.24	3.76	4.52	3.6	4.21	4.06
November	1.84	2.23	1.61	1.7	1.63	1.77	1.76	2.08	1.97
December	0.64	1.3	0.91	1.3	1.21	1.44	1.24	1.3	1.58
January	1.08	1.03	1.1	1.2	1.2	1.19	1.47	1.29	1.36
February	1.41	1.64	1.85	1.35	2.03	2.19	1.95	2.69	2.24
Total	57.17	56.2	60.97	60.44	53.65	59.97	57.14	62.87	63.09

¹⁷ ETo = evapotranspiration of a grass crop

¹⁸ Source: CIMIS Station #93 (Lamont). (ETo values for October 1994 through March 1995 were estimated by regression analysis between CIMIS #93 (Lamont) and CIMIS #5 (Shafter)

¹⁹ Source: for 1995-96, April through December and all other years, data from CIMIS #125 (Arvin-Edison)

Table 3. Calculated Evapotranspiration demand (ETc) for various crops grown in the AEWS for Water Delivery Years 1999-00 through 2002-03

Crop	1999-00	2000-01	2001-02	2002-03
Acre-feet / Acre				
Alfalfa	3.89	3.74	4.08	4.11
Almonds	3.37	3.22	3.53	3.54
Almonds, Young	3.37	3.22	3.46	N/A
Apples	3.99	3.82	4.16	4.16
Apricots	3.37	3.22	3.53	3.54
Apricots, Young	3.31	0.05	3.46	N/A
Artichokes	4.59	4.61	0.27	N/A
Beans (green)	1.42	1.38	1.56	N/A
Broccoli (Fall)	N/A	N/A	0.46	N/A
Broccoli (Spring)	0.79	N/A	N/A	N/A
Cabbage (Fall)	N/A	N/A	0.80	N/A
Cabbage (Spring)	0.79	N/A	N/A	N/A
Carrots (Fall)	1.28	1.17	1.28	1.28
Carrots (Spring)	1.60	1.47	1.70	1.68
Cauliflower (Fall)	0.79	N/A	N/A	N/A
Cauliflower (Spring)	0.79	N/A	N/A	N/A
Cherries	3.99	3.82	4.16	4.16
Cherries, Young	3.99	3.82	4.16	4.16
Corn	2.49	2.48	2.64	2.64
Cotton	2.60	2.58	2.74	2.75
Flowers & Nursery	2.00	1.90	2.10	2.10
Grapefruit	2.75	2.62	2.88	2.89
Grapefruit, Young	N/A	0.16	2.70	N/A
Jojoba	2.75	2.62	2.85	2.88
Lemons	0.00	0.19	3.41	3.29
Lettuce (Fall)	1.02	0.92	1.01	1.00
Lettuce (Spring)	0.64	0.37	N/A	0.28
Melons, cucumbers, squash (all types)	1.78	1.79	1.91	1.91
Misc. Deciduous	3.29	3.14	3.43	3.44
Misc. Field	N/A	2.99	N/A	N/A
Misc. Hay & Grain	1.67	1.67	1.93	1.94
Misc. Subtropical Fruits	2.59	N/A	N/A	N/A
Misc. Subtropical Fruits, Young	2.59	N/A	N/A	N/A
Misc. Truck/Berry	3.76	3.63	3.94	3.93
Native Pasture	5.00	4.47	N/A	N/A
Onions & Garlic	2.05	2.05	2.36	2.36
Oranges	3.25	3.09	3.41	3.42
Oranges, Young	3.25	3.09	3.41	3.42
Peaches & Nectarines	3.29	3.14	3.43	3.44
Peaches & Nectarines, Young	3.29	3.14	3.43	N/A
Peppers (all types)	2.03	1.99	2.19	2.16
Pistachios	3.52	3.36	3.66	3.66
Plums	3.29	3.14	3.43	3.44
Plums, Young	N/A	N/A	N/A	3.44

Table 3. Calculated Evapotranspiration demand (ETc) for various crops grown in the AEWSD for Water Delivery Years 1999-00 through 2002-03 (Continued)

Crop	1999-00	2000-01	2001-02	2002-03
	Acre-feet / Acre			
Potatoes	1.66	1.51	1.76	1.76
Safflower	2.34	2.23	2.50	2.48
Sunflowers	2.30	N/A	N/A	N/A
Sweet Potatoes	N/A	1.98	N/A	N/A
Tomatoes	2.09	2.07	2.24	2.24
Tree Farm	N/A	N/A	3.59	3.59
Turf Farm	3.77	0.24	4.20	4.05
Urban Water	4.78	4.37	0.22	4.89
Vineyards	2.13	2.07	2.25	2.25
Vineyards, Young	2.13	2.07	2.25	2.25
Walnuts	3.48	3.34	3.62	3.60
Wheat	1.68	1.52	N/A	N/A

Table 3A. Calculated Evapotranspiration Demand (ETc) for Various Crops Grown in the AEWSD for Water Years 1994-95 through 1998-99

Crop	1994-95	1995-96	1996-97	1997-98	1998-99
	Acre-feet / Acre				
Alfalfa Hay	4.68	4.60	4.97	4.96	4.38
Almonds	3.28	3.14	3.50	3.43	3.01
Apples	3.86	3.77	4.13	4.03	3.57
Apricots	3.28	3.14	3.50	3.43	3.01
Beans (Green) – Spring	1.39	1.27	1.49	1.48	1.15
Beans (Green) – Fall	N/A	N/A	N/A	N/A	0.92
Carrots – Spring	1.57	1.40	1.68	1.91	1.30
Carrots – Fall	N/A	N/A	N/A	N/A	1.13
Citrus	2.62	2.58	2.79	2.77	2.46
Cole Crops	0.92	0.81	0.93	0.99	0.79
Cotton	2.53	2.48	2.72	2.59	2.43
Field Corn – Spring	2.45	2.37	2.62	2.49	2.33
Field Corn – Fall	N/A	N/A	N/A	N/A	2.19
Grapes	2.66	2.58	2.86	2.76	2.48
Irrigated Pasture	4.62	4.49	4.91	4.83	4.27
Lettuce – Spring	0.65	0.60	0.67	0.71	0.62
Lettuce – Fall	N/A	N/A	N/A	N/A	0.90
Melons	1.80	1.68	1.87	1.80	1.64
Misc. Deciduous	3.34	3.23	3.57	3.49	3.07
Misc. Vegetables	2.10	1.96	2.21	2.13	1.90
Nursery	2.50	2.50	2.50	2.50	2.50
Onions	2.10	1.94	2.24	2.33	1.86
Peach/Nectarine	3.20	3.07	3.42	3.36	2.94
Pears	3.20	3.07	3.42	3.36	2.94
Peppers	2.02	1.85	2.14	2.10	1.74
Pistachios	3.40	3.31	3.52	3.55	3.79
Plums	3.20	3.07	3.42	3.36	2.94
Potatoes – Spring	1.63	1.46	1.74	1.82	1.36
Potatoes – Fall	N/A	N/A	N/A	N/A	1.28
Safflower	2.33	2.11	2.46	2.47	1.98
Small Grains	1.78	1.60	1.88	1.96	1.51
Sugarbeets	3.27	3.09	3.50	3.41	2.99
Tomatoes	2.10	1.95	2.20	2.15	1.88
Walnuts	3.33	3.28	3.59	3.46	3.11

Table 4. Irrigated acreage of various crops grown in the AEWS for Water Delivery Years 1999-00 through 2002-03

Crop	1999-00	2000-01	2001-02	2002-03
	Acres			
Alfalfa	2,328	2,039	1,601	1,424
Almonds	4,255	3,613	3,556	3,105
Almonds, Young	320	218	197	0
Apples	1,711	1,069	1,052	1,052
Apricots	1,038	625	391	426
Apricots, Young	155	0	36	0
Artichokes	12	15	0	0
Beans (green)	122	524	232	0
Broccoli (Fall)	0	0	45	0
Broccoli (Spring)	157	0	0	0
Cabbage (Fall)	0	0	55	0
Cabbage (Spring)	45	0	0	0
Carrots (Fall)	10,887	8,979	8,571	10,493
Carrots (Spring)	4,859	4,520	4,409	3,746
Cauliflower (Fall)	55	0	0	0
Cauliflower (Spring)	79	0	0	0
Cherries	206	586	922	1,310
Cherries, Young	163	336	88	43
Corn	371	97	373	578
Cotton	6,660	7,132	8,661	5,771
Flowers & Nursery	197	276	331	150
Grapefruit	79	151	118	253
Grapefruit, Young	0	0	135	0
Joboba	20	20	20	20
Lemons	0	0	79	79
Lettuce (Fall)	60	30	57	661
Lettuce (Spring)	51	0	0	80
Melons, cucumbers, squash (all types)	2,519	2,132	2,233	1,932
Misc. Deciduous	167	63	39	39
Misc. Field	0	14	0	0
Misc. Hay & Grain	1,236	10,096	8,992	7,228
Misc. Subtropical Fruits	41	0	0	0
Misc. Subtropical Fruits, Young	125	0	0	0
Misc. Truck/Berry	400	315	395	965
Native Pasture	164	164	0	0
Onions & Garlic	3,191	2,737	3,422	4,018
Oranges	13,145	12,333	13,104	13,737
Oranges, Young	1,006	1,682	818	41
Peaches & Nectarines	2,749	2,600	2,955	3,540
Peaches & Nectarines, Young	157	254	532	0
Peppers (all types)	1,521	1,407	1,688	1,192

Table 4. Irrigated acreage of various crops grown in the AEWSD for Water Delivery Years 1999-00 through 2002-03 (Continued)

Crop	1999-00	2000-01	2001-02	2002-03
	Acres			
Pistachios	80	165	165	165
Plums	291	303	332	332
Plums, Young	0	0	0	160
Potatoes	13,356	16,111	16,423	19,827
Safflower	762	1,250	1,981	60
Sunflowers	80	0	0	0
Sweet Potatoes	0	5	0	0
Tomatoes	2,368	2,573	1,914	3,497
Tree Farm	0	0	40	40
Turf Farm	60	0	60	60
Urban Water	259	191	0	102
Vineyards	28,424	28,803	28,758	29,900
Vineyards, Young	1,360	980	1,128	147
Walnuts	507	507	507	507
Wheat	9,824	0	0	0
Total	117,622	114,915	116,415	116,680

**Table 4A. Irrigated Acreage of Various Crops Grown in the AEWSD for Water Years
1994-95 through 1998-99**

Crop	1994-95	1995-96	1996-97	1997-98	1998-99
	Acres				
Alfalfa Hay	3,670	2,388	2,143	3,299	3,682
Almonds	4,229	4,067	3,958	4,260	4,191
Apples	809	1,494	1,570	1,393	1,590
Apricots	232	275	341	359	315
Beans (Green) – Spring	118	0	0	0	0
Beans (Green) – Fall	0	0	0	0	240
Carrots – Spring	15,720	15,891	15,843	12,078	2,769
Carrots – Fall	0	0	0	0	9,042
Citrus	12,066	12,457	12,504	13,223	14,022
Cole Crops	0	0	0	0	0
Cotton	12,812	14,176	15,535	12,974	7,764
Field Corn – Spring	0	103	464	410	709
Field Corn – Fall	0	0	0	0	160
Grapes	24,561	25,357	26,913	27,928	28,667
Irrigated Pasture	254	24	420	97	2,638
Lettuce – Spring	387	382	0	386	178
Lettuce – Fall	0	0	0	0	569
Melons	2,454	3,025	3,250	3,320	2,749
Misc. Deciduous	517	398	687	608	478
Misc. Vegetables	0	647	230	372	435
Nursery	577	290	218	248	250
Onions	3,813	5,064	6,775	3,738	3,942
Peach/Nectarine	4,118	4,192	3,766	3,867	3,844
Pears	0	6	0	0	0
Peppers	1,106	830	754	1,138	1,721
Pistachios	153	113	168	157	158
Plums	588	542	521	527	569
Potatoes – Spring	17,087	17,848	23,976	15,728	19,807
Potatoes – Fall	0	0	0	0	3,869
Safflower	315	0	0	140	137
Small Grains	4,928	5,165	6,046	4,871	9,957
Sugarbeets	40	0	0	0	0
Tomatoes	2,351	2,312	2,651	1,133	1,780
Walnuts	610	610	607	535	535
Total	112,292	117,614	129,170	116,464	126,767

Table 5. Total Etc demand of various crops grown in the AEWSd for Water Delivery Years 1999-00 through 2002-03²⁰

Crop	1999-00	2000-01	2001-02	2002-03
	Acre-feet			
Alfalfa	9,054	7,626	6,534	5,855
Almonds	14,333	11,622	12,555	10,989
Almonds, Young	1,078	701	681	0
Apples	6,835	4,083	4,377	4,372
Apricots	3,496	2,011	1,381	1,508
Apricots, Young	513	0	125	0
Artichokes	55	69	0	0
Beans (green)	173	725	361	0
Broccoli (Fall)	0	0	21	0
Broccoli (Spring)	124	0	0	0
Cabbage (Fall)	0	0	44	0
Cabbage (Spring)	35	0	0	0
Carrots (Fall)	13,946	10,473	10,992	13,459
Carrots (Spring)	7,750	6,625	7,475	6,310
Cauliflower (Fall)	44	0	0	0
Cauliflower (Spring)	62	0	0	0
Cherries	823	2,238	3,836	5,445
Cherries, Young	651	1,283	366	179
Corn	924	241	984	1,528
Cotton	17,317	18,378	23,717	15,863
Flowers & Nursery	394	525	694	315
Grapefruit	217	395	340	732
Grapefruit, Young	0	0	364	0
Jojoba	55	52	58	58
Lemons	0	0	269	260
Lettuce (Fall)	61	28	57	661
Lettuce (Spring)	14	19	0	23
Melons, cucumbers, squash (all types)	4,485	3,812	4,264	3,689
Misc. Deciduous	549	198	134	134
Misc. Field	0	42	0	0
Misc. Hay & Grain	193	16,852	17,367	14,015
Misc. Subtropical Fruits	106	0	0	0
Misc. Subtropical Fruits, Young	324	0	0	0
Misc. Truck/Berry	1,505	1,143	1,556	3,796
Native Pasture	820	734	0	0
Onions & Garlic	1,257	5,613	8,062	9,484
Oranges	42,700	38,145	44,625	46,940
Oranges, Young	3,268	5,202	2,786	140
Peaches & Nectarines	9,035	8,152	10,121	12,189
Peaches & Nectarines, Young	516	796	1,822	0

²⁰ Results for year 2001-02 differ from previously published. Earlier calculations were based on estimates of 2002-03 crops that use water in the 2001-02 water year. Current calculations are base on actual cropage data.

Table 5. Total ETc demand of various crops grown in the AEWSD for Water Delivery Years 1999-00 through 2002-03 (Continued)

Crop	1999-00	2000-01	2001-02	2002-03
	Acre-feet			
Peppers (all types)	3,094	2,803	3,705	2,574
Pistachios	281	554	604	604
Plums	956	950	1,137	1,143
Plums, Young	0	0	0	551
Potatoes	22,178	24,300	28,898	34,851
Safflower	1,780	2,785	4,958	149
Sunflowers	184	0	0	0
Sweet Potatoes	0	10	0	0
Tomatoes	4,955	5,333	4,296	7,846
Tree Farm	0	0	143	144
Turf Farm	226	0	252	243
Urban Water	1,238	834	0	498
Vineyards	60,488	59,533	64,632	67,284
Vineyards, Young	2,894	2,026	2,535	331
Walnuts	1,763	1,695	1,838	1,826
Wheat	1,535	14,978	0	0
Total	244,285	263,586	278,963	275,988

**Table 5A. Total ETC Demand of Various Crops Grown in the AEWSD
for Water Years 1994-95 through 1998-99**

Crop	1994-95	1995-96	1996-97	1997-98	1998-99
	Acre-feet				
Alfalfa Hay	17,180	10,987	10,655	16,356	16,129
Almonds	13,858	12,770	13,846	14,630	12,609
Apples	3,125	5,626	6,486	5,611	5,681
Apricots	760	863	1,193	1,233	948
Beans (Green) – Spring	164	0	0	0	0
Beans (Green) – Fall					220
Carrots – Spring	24,642	22,288	26,570	23,108	3,591
Carrots – Fall					10,255
Citrus	31,616	32,087	34,942	36,630	34,480
Cole Crops	0	0	0	0	0
Cotton	32,385	35,124	42,296	33,639	18,844
Field Corn – Spring	0	245	1,214	1,021	1,651
Field Corn – Fall					351
Grapes	65,360	65,480	76,884	77,182	71,078
Irrigated Pasture	1,174	108	2,064	468	11,264
Lettuce – Spring	253	231	0	275	111
Lettuce – Fall					510
Melons	4,406	5,082	6,094	5,967	4,499
Misc. Deciduous	1,724	1,285	2,453	12,869	1,470
Misc. Vegetables	0	1,271	508	7,937	827
Nursery	1,443	725	545	620	625
Onions	8,021	9,830	15,173	8,697	7,322
Peach/Nectarine	13,169	12,890	12,870	12,986	11,282
Pears	0	18	0	0	0
Peppers	2,233	1,538	1,613	2,395	3,003
Pistachios	521	374	591	558	599
Plums	1,880	1,667	1,780	1,770	1,670
Potatoes – Spring	27,850	26,010	41,776	28,550	26,969
Potatoes – Fall					4,944
Safflower	733	0	0	346	271
Small Grains	8,777	8,269	11,393	9,554	15,056
Sugarbeets	131	0	0	0	0
Tomatoes	4,940	4,515	5,843	2,438	3,346
Walnuts	2,033	1,998	2,177	1,852	1,666
Total	268,378	261,282	318,964	306,691	271,270

Table 6. Leaching Requirement (LR) for Various Crops grown in the AEWSD for Water Years 1999-00 through 2002-03²¹

Crop	1999-00	2000-01	2001-02	2002-03
	Acre-feet			
Alfalfa	328	223	160	195
Almonds	709	462	416	498
Almonds, Young	53	28	23	0
Apples	338	162	145	198
Apricots	161	75	43	64
Apricots, Young	24	0	4	0
Artichokes	4	4	0	0
Beans (green)	14	45	19	0
Broccoli (Fall)	0	0	0	0
Broccoli (Spring)	5	0	0	0
Cabbage (Fall)	0	0	1	0
Cabbage (Spring)	1	0	0	0
Carrots (Fall)	1,088	650	565	959
Carrots (Spring)	605	411	384	450
Cauliflower (Fall)	2	0	0	0
Cauliflower (Spring)	3	0	0	0
Cherries	41	89	127	247
Cherries, Young	32	51	12	8
Corn	40	8	29	61
Cotton	155	134	145	131
Flowers & Nursery	11	12	13	8
Grapefruit	9	14	10	29
Grapefruit, Young	0	0	11	0
Jojoba	2	2	2	2
Lemons	0	0	8	10
Lettuce (Fall)	4	1	2	35
Lettuce (Spring)	1	1	0	1
Melons, cucumbers, squash (all types)	147	101	94	111
Misc. Deciduous	24	7	4	5
Misc. Field	0	0	0	0
Misc. Hay & Grain	2	158	137	149
Misc. Subtropical Fruits	5	0	0	0
Misc. Subtropical Fruits, Young	14	0	0	0
Misc. Truck/Berry	74	45	52	172
Native Pasture	9	7	0	0
Onions & Garlic	80	284	340	550
Oranges	1,842	1,325	1,295	1,858

²¹ Results for year 2001-02 differ from previously published. Earlier calculations were based on estimates of 2002-03 crops that use water in the 2001-02 water year. Current calculations are based on actual croplage data.

**Table 6. Leaching Requirement (LR) for Various Crops grown in the AEWSD
for Water Years 1999-00 through 2002-03 (Continued)**

Crop	1999-00	2000-01	2001-02	2002-03
	Acre-feet			
Oranges, Young	141	181	81	6
Peaches & Nectarines	390	283	294	483
Peaches & Nectarines, Young	22	28	53	0
Pistachios	8	13	12	16
Plums	47	38	38	52
Plums, Young	0	0	0	25
Potatoes	957	844	839	1,380
Safflower	23	30	44	2
Sunflowers	2	0	0	0
Sweet Potatoes	0	0	0	0
Tomatoes	141	123	83	206
Tree Farm	0	0	4	6
Turf Farm	4	0	3	4
Urban Water	22	12	0	8
Vineyards	2,991	2,366	2,142	3,051
Vineyards, Young	143	80	84	15
Walnuts	76	59	53	72
Wheat	18	140	0	0
Total	10,964	8,609	7,893	11,181

Table 6A. Leaching Requirement (LR) for Various Crops Grown in the AEWSD for Water Years 1994-95 through 1998-99

Crop	1994-95	1995-96	1996-97	1997-98	1998-99
	Acre-feet				
Alfalfa Hay	97.3	66.7	53.8	99.3	210.2
Almonds	105.0	103.8	93.6	118.9	221.0
Apples	23.7	45.7	43.8	45.6	99.6
Apricots	5.4	6.6	7.5	9.4	15.5
Beans (Green) – Spring	1.9	0.0	0.0	0.0	0.0
Beans (Green) – Fall	0.0	0.0	0.0	0.0	5.9
Carrots – Spring	282.3	274.0	271.1	284.1	96.1
Carrots – Fall	0.0	0.0	0.0	0.0	274.4
Citrus	211.1	229.7	208.0	262.3	531.0
Cole Crops	0.0	0.0	0.0	0.0	0.0
Cotton	47.2	54.9	55.1	52.6	62.6
Field Corn – Spring	0.0	1.8	7.2	7.3	25.4
Field Corn – Fall	0.0	0.0	0.0	0.0	5.4
Grapes	495.4	532.4	519.5	627.5	1,245.8
Irrigated Pasture	3.3	0.3	5.2	1.4	72.4
Lettuce – Spring	2.2	2.2	0.0	2.6	2.3
Lettuce – Fall	0.0	0.0	0.0	0.0	10.4
Melons	22.7	28.0	28.0	32.9	53.2
Misc. Deciduous	11.5	9.2	14.6	15.2	22.6
Misc. Vegetables	0.0	13.0	4.3	8.1	18.3
Nursery	0.0	5.8	0.0	0.0	11.8
Onions	76.3	100.3	128.6	88.7	161.8
Peach/Nectarine	87.9	92.3	76.6	93.0	173.8
Pears	0.0	0.1	0.0	0.0	0.0
Peppers	16.9	12.5	10.9	19.5	52.6
Pistachios	2.4	1.8	2.4	2.7	6.2
Plums	14.3	13.5	12.0	14.4	29.3
Potatoes – Spring	185.9	186.2	248.7	204.4	415.4
Potatoes – Fall	0.0	0.0	0.0	0.0	76.1
Safflower	1.6	0.0	0.0	0.8	1.3
Small Grains	16.4	16.6	19.1	19.2	64.3
Sugarbeets	0.2	0.0	0.0	0.0	0.0
Tomatoes	22.3	21.9	23.6	11.8	34.7
Walnuts	13.6	14.3	13.0	13.3	25.7
Total	1,746.8	1,833.8	1,846.4	2,035.0	4,025.1

**Table 7. Total of ETc and LR demand for crops grown in the AEWSd for Water
Delivery Years 1999-00 through 2002-03**

Crop	1999-00	2000-01	2001-02	2002-03
	Acre-feet			
Alfalfa	9,381	7,849	6,693	6,050
Almonds	15,041	12,084	12,971	11,487
Almonds, Young	1,131	729	704	0
Apples	7,173	4,245	4,522	4,571
Apricots	3,658	2,085	1,423	1,571
Apricots, Young	536	0	128	0
Artichokes	59	73	0	0
Beans (green)	187	770	379	0
Broccoli (Fall)	0	0	21	0
Broccoli (Spring)	129	0	0	0
Cabbage (Fall)	0	0	45	0
Cabbage (Spring)	37	0	0	0
Carrots (Fall)	15,035	11,123	11,557	14,418
Carrots (Spring)	8,355	7,037	7,859	6,760
Cauliflower (Fall)	45	0	0	0
Cauliflower (Spring)	65	0	0	0
Cherries	864	2,327	3,963	5,691
Cherries, Young	683	1,334	378	187
Corn	964	249	1,012	1,589
Cotton	17,472	18,512	23,863	15,993
Flowers & Nursery	405	537	707	324
Grapefruit	227	409	350	760
Grapefruit, Young	0	0	375	0
Jojoba	57	54	59	60
Lemons	0	0	277	271
Lettuce (Fall)	65	29	60	696
Lettuce (Spring)	15	20	0	24
Melons, cucumbers, squash (all types)	4,631	3,913	4,359	3,799
Misc. Deciduous	573	204	137	140
Misc. Field	0	42	0	0
Misc. Hay & Grain	195	17,010	17,505	14,164
Misc. Subtropical Fruits	111	0	0	0
Misc. Subtropical Fruits, Young	338	0	0	0
Misc. Truck/Berry	1,579	1,188	1,607	3,969
Native Pasture	829	741	0	0
Onions & Garlic	1,337	5,898	8,401	10,033
Oranges	44,542	39,470	45,920	48,798
Oranges, Young	3,409	5,383	2,867	146
Peaches & Nectarines	9,424	8,435	10,415	12,672
Peaches & Nectarines, Young	538	824	1,875	0

Table 7. Total of ETc and LR demand for crops grown in the AEWSD for Water Delivery Years 1999-00 through 2002-03 (Continued)

Crop	1999-00	2000-01	2001-02	2002-03
	Acre-feet			
Peppers (all types)	3,247	2,914	3,828	2,691
Pistachios	289	567	616	620
Plums	1,004	988	1,175	1,195
Plums, Young	0	0	0	576
Potatoes	23,134	25,145	29,737	36,231
Safflower	1,803	2,815	5,002	151
Sunflowers	186	0	0	0
Sweet Potatoes	0	10	0	0
Tomatoes	5,096	5,457	4,379	8,052
Tree Farm	0	0	148	149
Turf Farm	230	0	255	247
Urban Water	1,259	846	0	506
Vineyards	63,480	61,898	66,774	70,335
Vineyards, Young	3,037	2,106	2,619	346
Walnuts	1,839	1,753	1,891	1,899
Wheat	1,553	15,118	0	0
Total	255,249	272,194	286,856	287,169

**Table 7A. Total of ETc and LR Demand for Crops Grown in the
AEWSD for Water Years 1994-95 through 1998-99**

Crop	1994-95	1995-96	1996-97	1997-98	1998-99
	Acre-feet				
Alfalfa Hay	17,277	11,053	10,709	16,455	16,339
Almonds	13,963	12,874	13,939	14,749	12,830
Apples	3,149	5,672	6,530	5,656	5,781
Apricots	766	870	1,200	1,242	963
Beans (Green) – Spring	166	0	0	0	0
Beans (Green) – Fall	0	0	0	0	225
Carrots – Spring	24,924	22,562	26,841	23,392	3,687
Carrots – Fall	0	0	0	0	10,529
Citrus	31,828	32,317	35,150	36,892	35,011
Cole Crops	0	0	0	0	0
Cotton	32,432	35,179	42,351	33,692	18,907
Field Corn – Spring	0	246	1,221	1,028	1,677
Field Corn – Fall	0	0	0	0	356
Grapes	65,855	66,013	77,404	77,809	72,324
Irrigated Pasture	1,177	108	2,069	470	11,337
Lettuce – Spring	255	233	0	278	113
Lettuce – Fall	0	0	0	0	521
Melons	4,429	5,110	6,122	6,000	4,552
Misc. Deciduous	1,736	1,294	2,467	12,884	1,492
Misc. Vegetables	0	1,284	513	7,945	846
Nursery	1,443	731	545	620	637
Onions	8,097	9,930	15,301	8,786	7,484
Peach/Nectarine	13,257	12,982	12,946	13,079	11,456
Pears	0	19	0	0	0
Peppers	2,250	1,550	1,624	2,415	3,055
Pistachios	523	376	593	560	605
Plums	1,895	1,680	1,792	1,784	1,699
Potatoes – Spring	28,036	26,196	42,025	28,754	27,384
Potatoes – Fall	0	0	0	0	5,020
Safflower	734	0	0	347	273
Small Grains	8,793	8,286	11,412	9,574	15,120
Sugarbeets	131	0	0	0	0
Tomatoes	4,962	4,537	5,867	2,450	3,380
Walnuts	2,047	2,012	2,190	1,865	1,692
Total	270,125	263,116	320,810	308,726	275,295

ATTACHMENT

N

ATTACHMENT A

LEGAL CERTIFICATION AND APPORTIONMENT REQUIRED FOR WATER MEASUREMENT

Arvin-Edison Water Storage District (AEWSD or District) has the legal access necessary to install, measure, maintain, operate and monitor a measurement device at each and every farm-gate/turnout.

The District's Rules and Regulations provide the necessary legal right of access (Division II (1) (d)). In addition, the District's distribution system has legal right of way and encroachment documents for all facilities', including each turnout.

Therefore, no additional information is required of AEWSD for this section.

ATTACHMENT B

ENGINEER CERTIFICATION AND APPORTIONMENT REQUIRED FOR WATER
MEASUREMENT

Arvin-Edison Water Storage District (AEWSD or District) measures water volume (in acre-feet) at each and every farm-gate/turnout.

Therefore, no additional information is required of AEWSD for this section.

ATTACHMENT C

DESCRIPTION OF WATER MEASUREMENT BEST PROFESSIONAL PRACTICES

Arvin-Edison Water Storage District (AEWSD or District) measures water volume (in acre-feet) at each and every farm-gate/turnout.

COLLECTION:

District staff manually reads each and every farm-gate/turnout which has a volumetric totalizer. Upon taking the reading, the value is transcribed to its daily paperwork, which is then transferred to meter cards which are housed at Headquarters' in the Watermaster's office. At the end of the month, the meter cards are used for billing/invoice purposes.

FREQUENCY:

For each farm-gate/turnout that request a change in flow, a meter read is taken manually by AEWSD staff.

At the end of each month, each and every farm-gate/turnout meter read is taken manually by AEWSD staff.

Upon a discrepancy or "missing/incorrect digit" or general informational purposes the meter may be read on a case-by-case or instance basis.

METHOD OF DETERMINING IRRIGATED ACRES:

The District's Engineering Department collects both Spring data, from April through July, and Fall data, in October and November, through field observations covering the entire 131,600 acre boundary. The data is collected and entered in an ArcGIS geodatabase, with aerial photography, by cropped field, in order to produce maps and summarize data.

Land Use Classes were categorized according to the State of California's Department of Water Resources (DWR) "Standard Land Use Legend" updated in September 2005. The DWR Standard Land Use Legend categorizes land use into four major classes: Agricultural, Semi-Agricultural, Urban, and Native. These classes are subdivided by crop type, land use and irrigation method.

QUALITY CONTROL AND QUALITY ASSURANCE PROCEDURES:

For meter reads, each meter reading is verified by Watermaster orders and also cross referenced with typical or historical water usage.

ATTACHMENT D

DOCUMENTATION OF WATER MEASUREMENT CONVERSION TO VOLUME

Arvin-Edison Water Storage District (AEWSD or District) measures water volume (in acre-feet) at each and every farm-gate/turnout.

Therefore, no additional information is required of AEWSD for this section.

ATTACHMENT E

DEVICE CORRECTIVE ACTION PLAN REQUIRED FOR WATER MEASUREMENT

All existing Arvin-Edison Water Storage District (AEWSD or District) measurement devices at each and every farm-gate/turnout are of plus or minus 2% accuracy based on manufacturer specifications.

In addition, given AEWSD's historical practices of reading/inspecting daily during use and at a minimum monthly regardless of use, replacement of nearly 5% of devices on an annual basis and as well as other miscellaneous quality control steps (water use review, water user input, cross references to other meters, etc.) a corrective action plan is not necessary.

Therefore, no additional information is required of AEWSD for this section.

End of Water Management Plan